1. **LOTO SPECIFIC PROCEDURE**
    - **Documented step by step captured in LOTO specific procedures shall be developed and utilized in activities to shut down, isolate, block and secure machinery or process equipment to control hazardous energy**

2. **LOTO STEPS (LOTO PROCESS)**

Step 1: "Preparation for LOTO"

- **Make sure the availability of LOTO Equipment specific procedure.**
- **Review LOTO Equipment specific procedure before use.**
- **Fill and sign the LOTO Certificate before work execution.**

Step 2: "Securing LOTO"

- **De-energize the Equipment/System according LOTO Equipment specific procedure.**
- **Perform LOTO the equipment .**
- **Control the execution of LOTO**
- **Verify de-energizing.**

Step 3: "Try out and verification"

- **Try-out by the persons who is going to work on equipment**
- **Put personal lock on the LOTO box or satellite box.**
- **Get the work permit.**
- **Start working.**

Step 4: "LOTO removal (Temporary Release or Work finished)"

- **If work is not finished, yet leave the locks on the LOTO box. If you remove the locks you have to go back to step 3**
- **When work is finished, remove personal lock from the LOTO box.**
- **Remove LOTO equipment according LOTO Equipment specific procedure**.

3. **Who will do Verification of Isolation**
    - **Prior to starting work on machinery or process equipment that is under LOTO, the authorized employee who placed the device(s) shall verify by testing the equipment that full isolation resulting in a zero-energy state has been accomplished before beginning the work.**

4. **WHAT IS LOTO (Lock-Out/Tag-Out)-**

- **Whenever service or maintenance is performed on machinery or process equipment LOTO is required**
- **Lockout devices and Tag-Out devices shall be the only devices(s) used for controlling energy**

NOTES -LOTO PROCESS IN THE FIELD

- **LOTO devices shall be used in accordance with the following steps:**
- **The equipment\system qualified area owner shall put the owner lock in the energy source (equipment\system) to isolate it.**
- **The key of owner lock (Red Color) shall be maintained inside the LOTO Lockbox (Movable or fixed).**
- **The LOTO authorized (owner) shall verify that all LOTO verification points are isolated as per LOTO specific procedure.**
- **The LOTO authorized (owner) shall lock "Green" LOTO Lockbox by the General lock**
- **The key of General lock shall be maintained inside the LOTO Key Cabinet (fixed). One LOTO Key Cabinet shall be provided for LOTO Coordinator).**
- **The LOTO Coordinator shall lock LOTO Key Cabinet by LOTO Coordinator Lock. (Black color)**
- **All LOTO affected persons shall lock LOTO Lockbox by their personal locks (Yellow Color).**
- **The satellite box can be utilized in additional to LOTO Lockbox if there is extra group of workers from different disciplines work in same isolated equipment or for workers work in the same group.**
- **The LOTO Coordinator shall control and maintain the LOTO Lockbox.**
- **The LOTO affected supervisor shall control and maintain the satellite box.**
- **The Lockbox number and satellite box number to be register in LOTO Certificate**

Notes: RESPONSIBILITY OF EACH PERSON INVOLVES IN LOTO PROCESS

- **Owner/Isolator LOTO Locks (Red Color): An owner or isolator LOTO lock is a unique lock with one unique key in combination with a general LOTO tag. It shall be used in the isolation point at the field.**
- **Authorized LOTO Locks (Green Color): A general LOTO lock (LOTO authorized) is a unique lock with one unique key in combination with a general LOTO tag. It shall be used to lock the lock box only**
- **Personal LOTO Locks (Yellow Color): A Personal and Executer LOTO lock is a unique lock with one unique key in combination with a personal LOTO tag. It shall be used to lock the lock box or satellite box.**
- **Transition Lock (Blue Color): Single-keyed locks that indicates work on LOTO-applied equipment has stopped temporarily and no one is currently performing work on that equipment. (e.g. Waiting for spare parts) can be placed on LOTO box or on energy isolation device.**

5. **WHAT IS Isolation:**
   - **A set of measures taken to de-energize the energy sources of the equipment such that energization of the equipment is not possible and energy/power cannot re-circulate in it without deliberate action by all the authorized persons.**

6. **WHAT IS Mechanical Isolation**

   Is usually achieved by such means as blinding or blanking, removal of pipe sections or spool pieces, double block and bleed, blocking/ disconnecting all mechanical linkages. Energy sources include electrical, mechanical, hydraulic, pneumatic (air), chemical, thermal, radioactive, gravity…

7. **For confine space which type of isolation is required?**
   - **Blind and/or physical disconnection**

8. **WHIP LAST ARRESTOR**

   Designed to prevent hose whip if the hose couplings or clamps separate, whip checks create a bridge between each side of a hose fitting to create an added layer of safety.

9. **Line Break**
   - **Line breaking is the intentional opening of a pipe, line, or other part of a process that contains or has contained material capable of causing injury by virtue of temperature, pressure or chemical properties to people and/or the environment.**

10. **When work permit will be considered suspended**
    - **Any deviation, without appropriate authorization, shall be result in immediate suspension of the permit. (Any employee can do the suspension and report it to the Issuer).**
    - **In case of an emergency/fire alarm situation in that specific area, the work permit shall automatically be suspended, it shall be revalidated before work can commence again.**

11. **When work permit will get cancel?**
    - **If work is not started within two hours after issuance of permit, or if there is an interruption of work for more than 2 hours.**
    - **Change of work environment conditions in the unit or area, e.g., venting, liquid hydrocarbon spillage**
    - **Injury or accident during execution of work.**
    - **When emergency alarm is sounded / activated in effected unit.**
    - **Note: Emergency drill / fault alarms shall not cancel the issued work permits.**

12. **Who will conduct LMRA assessment**

    Permit receiver and "LMRA" assessments are carried out in the field prior to starting any tasks/ jobs by the people doing the work.

13. **Who will receive Confined Space Entry Permit-**

    Certified Direct hire supervisor

14. **Who will receive Radiation Permit-**
    Certified RSO safety officer

15. **Validity of the Permit – 12 Hr**

16. **Validity of the Certificate- Until the completion of work**

17. **What is hazard assessment**
    - **A Hazardous Assessment and control form is the master document for all work permit types except Confined Space Entry Permit that is required Formal JSA as per OMS-311.02 (SHEM02.02) procedure work activity.**
    - **The Area Specialist Operation/Maintenance Coordinator shall organize the Hazardous Assessment and Control Form document once all the risk relevant identified and risk assessed as well as defined control measures are in place and complete.**
    - **Issuer/receiver supervisor shall conduct the hazard evaluation then record risk rating at backside (Section-6) of Hazardous Assessment and Control form referring to risk evaluation guidelines table.**
    - **Validity of this form is one week unless endorsed by both Owner Manager & Maintenance Manager up to 30 days.**
    - **The decision on the requirement for a higher-level risk assessment (JSA) as per SHEM02.02 shall be based on a TRF-Score (Total risk Factor) of 6**

18. **What is excavation and When excavation clearance certificate is required**
    - **Excavation is any work that requires breaking the earth's surface**
    - **10 cm depth or more required excavation clearance certificate**

19. **At what distance excavated material to be placed**
    - **Do not place excavated materials or mechanical equipment within 1 meter of the edge of any excavation**

20.At what distance heavy equipment should be placed away from excavation

- **Keep equipment and other heavy objects at least 2 meters from the edge of the excavation.**

21.When Protective system is required for excavation

- **When excavations are 1.2 meters (4 feet) or deeper**

Note: Do not cut red concrete as the red color concrete is used to mark underground electrical systems.

- **Do not use mechanical excavation within 1 meter of any underground services.**
- **Provide ladders or other suitable means of access / egress to excavations at a maximum spacing of 30 meters on the perimeter of open excavations and 7.5 meters for trench excavations greater than 1.2 meters in depth.**
- **An easy and safe means of exit shall be provided if the excavation is 1.2 meters (4 feet) deep or greater. This exit shall be within 7.5 meters (25 feet) of every worker. 8. If a ladder is used as an exit, the ladder shall be secured and extend 1 meter (3 feet) above the landing**
- **Excavation shall be inspected periodically for presence of groundwater, change in soil condition and effects of weather such as rain or wind. Safe means of continuing the work shall be established as any condition changes.**

22.What is Lifting plan

- **An assessment by a competent person(s) (Certified Riggers) of the factors affecting the safety of a proposed lift and the controls necessary to manage**

23.. What is non critical lift

- **Non-Critical Lift A Non-Critical Lift involves lower risk, simple lifting operations to which none of the Complex items apply to the lift**

24. What is critical lift

Critical Lift A Critical lift which requires a higher level of experience, qualification, and/or certification in order to plan and/or execute than a non- Critical Lift.

25. Gas test for Confined Spaces

- **The gas tester shall not enter the confined space for testing purposes unless the results across the cross section (top, middle and bottom sections) indicate that the oxygen level range between 19.5%~21%.**

Notes Related to confined space

- **Entrance into a confined space is not allowed if the oxygen level is below 19.5%**
- **Oxygen content above 23% can cause explosions or vigorous burning of flammable materials, including hair and/or clothing.**
- **Conduct gas test considering the task to be carried out¬ Oxygen ¬ Flammable gases and vapours ¬ Potential toxic substances**

26. WHAT IS WORK PERMIT

Work permits are used to perform any activities by non-operations personnel. The Work Permit shall be issued by an authorized "permit issuer" of the area where work is to be performed.

27. TYPES OF WORK PERMIT AND CERTIFICATE

- **General Work Permit**
- **Hot Work Permit**
- **Electrical Work Permit**
- **Confined Space Entry Permit**
- **Excavation Work Permit**
- **Radiation Work Permit**
- **Lifting Work Permit**
- **High Pressure Jetting Work Permit**

Certificate

- Excavation clearance certificate
- Lifting plan
- LOTO certificate

Notes related to work permit

A General Work Permit shall be required for all such activities.

Some examples are:

- Vehicle Entry in non-hydro carbon area/common area.
- Work at height activity.
- Flange tightening, gland packaging & gasket tightening activities.
- Installing & removal of blind activities.
- Adjusting & repairing of instruments that will not have any effect on the operation, process or personal.
- Plant Area cleaning and housekeeping activities (not part of Operational activities)
- Visual monitoring - Any machinery or instrument monitoring such as vibration or noise testing.
- Plumbing work
- Changing Lamps in buildings

28. What is Hot work

Hot Work Permit Written authorization to perform operations activity capable of supplying ignition energy for igniting flammable mixtures or combustible materials that may be released to create a potential fire or explosion hazard using Hot Work Permit

29. Why confined space entry permit is required

Confined Space Entry Permit shall set up the minimum requirements for Confined Space Entry Permit to protect personnel from hazards such as oxygen deficiency, toxic materials, flammable substances and energy or movable parts of power-driven equipment when working in

confined spaces as well as rescue requirements using Confined Space Entry Work Permit

30. What is confined space

Confined Space is any enclosure space (though not always entirely) having a limited opening for entry and exit; presents serious hazards to occupants; or which is not intended for continuous employee occupancy. The space is large enough and configured to allow entry (including partial entry) of a person (s) for the performance of an assigned task.

Example :Confined spaces include, but are not limited to, storage tanks, process vessels, ventilation and exhaust ducts, manholes, pits, and excavations more than 1.2 meters in depth.

Notes

LEL (Lower Explosive Limit) The lowest concentration at which a flammable substance can catch fire upon contact with an ignition source. The LEL shall be Zero (0%) for any entry into Confined Space at all.

31. What is rescue plan

- A Rescue Plan that is used to rescue the persons from the Confined Space in case of Emergency. Rescue plan shall be approved and all actions shall be taken prior to work permit.

32. General Guidelines for Confined Space Entry Permit(SHEM Guideline)

- Permit issuer shall ensure that Confined Space Entry Permit is obtained before entry is authorized.
- As issuer only Supervisors and above are authorized to issue and receiver only Supervisor-direct hire, for the Confined Space Entry Permit and all work permit types inside after joint visitpermit
- Permit issuer shall ensure atmosphere within the confined space is tested as necessary to ensure that the continuous forced air ventilation is preventing the accumulation of hazardous gases.
- Blind list with process equipment to be attached to the LOTO.
- Marked P & ID's

- **Rescue plan**
- **Ventilation plan (The pressure requirement and supply volume of air shall match the equipment specification to achieve the desired ventilation.)**
- **Only explosion proof electric fans/air movers shall be used to ventilate confined spaces that may contain flammable gases or dust.**
- **Fans and air movers must be electrically bonded to the vessel/ grounded to prevent the accumulation and discharge of static electricity.**
- **Standby Man shall be mandatory for all confined space entry permits.**
- **Issuer shall suspend the Confined Space Entry Permit when a condition is not met the requirement of the Confined Space Entry Permit.**
- **In case entry is not made inside the confined space within half hour after Confined Space permit issued, the confined space work permit shall be considered as suspended and need to do the gas test and reconfirm all requirements again before entering the confined space permit.**
- **DO NOT assign Standby Man and Fire watch with any other duties while acting in the capacity of Standby Man & Fire Watch and allow leaving their post while workers are still inside.**
- **Permit receiver & issuer shall inspect retrieval system prior to initial entry into the confined space area to ensure that the equipment is functioning properly**
- **Display confined space entry permit at the job site or confined space entry point to allow entrants to confirm that permit entry requirements are in place.**
- **In case of radiation activity inside confined spaces, The RSO (Radiation Safety Officer) shall not allow any entrants including stand by Man to enter the barricaded area except radiographers. The Radiographers can be trained as Stand by man to do stand by man roles inside barricaded area as well as his roles for radiography purposes.**
- **Care shall be taken to ensure that contaminants are not drawn into the Confined Space from external sources, such as internal**

combustion engines, sewer drains, process vents, or hot work activities located close to open man ways. Ventilation arrangements shall not interfere with the entry and exit of personnel.

- **Keep compressed gas cylinders and welding machines outside, when welding or cutting is being performed in any confined space as Welding gas cylinders are not permitted inside the confined space.**
- **Any person entering to confined space shall have inspected O2 meter showing Oxygen concentration continuously and alarm in case of oxygen variation. In case of group entry, one person out of four shall have pocket oxygen meter.**
- **Interior heat stress shall be monitored by following Heat and Cold Stress procedure (SHEM-SP-12.06) requirement.**
- **Air Conditioner can be installed wherever it is convenient.**
- **Each person entering confined space with vertical entry shall wear a full body harness**
- **For any confined spaces, only 24V explosion proof light shall be used for illumination**
- **All electrical equipment shall be inspected and tested including the GFCI before operating them prior to initial use. One GFCI can be used in distribution panel for number of cables as per capacity.**

Notes : Permit issuer & receiver shall ensure concern users inspected lifelines for any defects or damages prior to all confined space entries.

<u>Personnel Entering Confined Space (Entrants)</u>

- **Ensuring that Work Permit related to the physical entry for the confined space is available.**
- **Informing the entry attendant before entering and after exiting the confined space by filling and signing the Confined Space Entry Log Sheet.**
- **Complying with all the requirements of the safe work permit for entry.**
- **Knows and understand the hazards in the space.**
- **Knows and uses equipment properly,**

- **Is able to communicate with the attendant.**
- **Knows what the acceptable entry conditions for the space are,**
- **Knows how to contact the attendant if conditions become unacceptable, Exits the space when ordered, when alarm sounds, or when dangerous situation is noted.**

33. What is Isolation:

Energy source shall be considered de-energized when the source is removed, locked out / tagged out.

Refer to Control Isolation of Hazardous Energy including LOTO procedure (SHEM--08.11) Electrical Safety procedure (SHEM-08.05).

34. What is the content available in Rescue Plan

- **For rescue plan, below guidelines to be followed in addition of Rescue Plan**
- **Rescue plan shall be conducted by a formal team consisting of Fire Captain/ Incident Commander/Fire Manager, Operation (Supervisor & above) and Maintenance (Supervisor & above).**
- **Rescue Plan shall be attached with confined space entry permit at site. Rescue Plan shall be approved/revalidate by Fire Captain / Incident Commander / Fire Manager, before start of any confined space entry and Permit issuer shall notify Fire Captain / Incident Commander / Fire Manager about any change in the confined space during the time of entry.**
- **Ensure availability of a retrieval system (retrieval line, full body harness, and a lifting device) to retrieve personnel from vertical type confined spaces more than 1.5-meter deep "if applicable by rescue plan".**
- **Attach other end of the retrieval line to a mechanical device or fixed point outside the confined space in such a manner that rescue can begin as soon as the rescuer becomes aware that rescue is necessary. Fire captain/ Incident Commander / Fire Manager is responsible to provide specifications of Mechanical device used for rescue purpose in Rescue Plan.**
- **Use safety harness that permits easy rescue of personnel from the confined space during emergency conditions and avoid suspending a person in an upright position either due to harness**

type that or the wrist type rescue harness. (A hoisting device or other effective means for lifting personnel from confined spaces is preferred).

- The permit issuer (Supervisor) shall notify the Fire captain/ Incident Commander / Fire Manager about the activity each shift as per the rescue plan.
- Rescue Man is required as per Formal JSA output; Rescue Man is required to be at location during the job execution.

Notes

No mechanical excavation shall be made within 1 meter of any underground services and is only allowed to a depth where it is confirmed that no services are in place.

35.WHEN WE WILL TO EVAULATE JSA IS REQUIRED

- Issuer/receiver supervisor shall conduct the hazard evaluation then record risk rating at backside of Hazardous Assessment and Control form referring to risk evaluation guidelines table.
- If risk factor is more than 6 JSA is required

36.WHO WILL RECEIVE ELECTRICAL PERMIT

Certified electrical technician or supervisor

37.WHAT IS DIFFERENCE BETWEEN JSA AND RISK ASSESSMENT

- A JSA focuses on job-specific risks and is typically performed for a single task, assessing each step of the job.
- Risk assessments assess safety hazards across the entire workplace and are oftentimes accompanied with a risk matrix to prioritize hazards and controls. Whereas

38.STEPS OF JSA

The 5 Steps to Conducting a Job Safety Analysis

1. Identify Hazardous Condition. The first step in conducting a job safety analysis is to identify the potential hazards on your job site. ...

2. **Determine Root Cause. ...**
3. **Eliminate Hazard. ...**
4. **Control Measures. ...**
5. **Evaluation of Effectiveness.**

39.STEPS OF RISK ASSESSMENT

1. **Identify hazards.**
2. **Assess the risks.**
3. **Control the risks.**
4. **Record your findings.**
5. **Review the controls.**

40.RISK MATRIX

The risk matrix is based on two intersecting factors: the likelihood the risk event will occur and the potential impact the risk event will have.

41.IN JSA IS RISK IS MORE THAN INSIGNIFICANT WHO WILL APPROVE THE JSA

Department senior manager

Notes

If remaining risk is either significant or major in JSA

- **Acknowledged by director and approved by president**

42.DIFFERENCE BETWEEN HAZARD AND RISK

A hazard is anything that could cause harm. And, risk, is a combination of two things – the chance that the hazard will cause harm and how serious that harm could be.

43.DIFFERENCE BETWEEN ACCIDENT AND INCIDENT

- **An accident is an event that has unintentionally happened, that results in damage, injury or harm.**
- **An incident is an event that has unintentionally happened, but this may not result in damage, harm or injury. Therefore, every accident can be an incident. However not all incidents can be termed as an accident.**

44.LOST TIME INJURY AND RESTRICTED WORK CASE

- **Lost Time Injury refers to incidents that result in a disability or an employee missing work due to an injury.**
- **Employees who return to work after sustaining an injury may also be counted as a Restricted Work Injury if they are unable to completely perform their job duties as outlined in their job description.**

45.CLASSES OF SABIC INCIDENT

Class A – Fatalties
Class B -Loss time injury
Class C – Medical treatment case
Class D – First Aid case
Class E – Near miss

46.ACCIDENT INVESTIGATION STEPS

1. **Secure the Scene. ...**
2. **Plan the Investigation. ...**
3. **Collect All Relevant Information. ...**
4. **Analyze Collected Data to Find the Root Cause. ...**
5. **Implement Corrective Actions. ...**
6. **Document and Share the Results.**

47.CLASSES OF FIRE(USA)

Class A Fires: “Ordinary” Fires. ...
Class B Fires: Liquids & Gases. ...
Class C Fires: Electrical Fires. ...
Class D Fires: Metallic Fires. ...
Class K Fires: Grease Fires or Cooking Fires. ...

48.METHOD OF FIRE EXTINGUISHING METHOD

- **Fires of any kind are put out using one of three methods: cooling, starvation, or smothering.**

49.WHAT IS ISOLATION

- **Isolate all forms of potentially hazardous energy to ensure that an accidental release of hazardous energy does not occur.**

50.TYPES OF ISOLATION

- **Mechanical and electrical isolation**

51.WHAT TYPES OF ISOLATION REQUIRED FOR CONFINED SPACE ACTIVITY

Blind and Physical disconnection

52.CLASSES OF SOIL

- **Soils can be classified as Type A, Type B, or Type C. Type A soil is the most stable soil in which to excavate. Type C is the least stable soil.**
- **Examples of type A soil include clay, silty clay, sandy clay, and clay loam.**
- **Examples of Type B soil include angular gravel, silt, silt loam,**
- **Examples of Type C soil include gravel, and sand.**

53.CRITICAL LIFTING CRITERIA

- **Lifting a personnel through cages/man.**
- **Any two crane used for lifting.**
- **Lifting over live electrical power Ines, process equipment's & pipe lines.**
- **If any lift load is greater than 50 tons.**
- **Any lift in which the total load is greater than 80% of cranes load chart capacity.**

NON-CRITICAL LIFTING CRITERIA

- **Lifting outside operation (off site, parking area, Admin building)area and load lifting below 50 Tons are non-critical.**

54.WHAT IS EXCAVATION AND EXCAVATION HAZARD AND PRECAUTIONS

Types of Excavations:

Excavations can be broadly categorized into two types:

Manual Excavation:
Manual excavation involves the use of shovels and other hand tools to remove soil or rock material. This method is suitable for smaller-scale projects and areas where machinery cannot access easily.

Mechanical Excavation:
Mechanical excavation utilizes machinery, such as excavators, to dig and remove larger volumes of soil or rock material. This method is efficient and widely used for larger-scale projects.

<u>Hazards</u>

- **Cave-ins and Soil Collapse**
- **Damage to Underground Facilities**
- **Fall of Personnel, Vehicles, Equipment, and Materials**
- **Presence of Toxic and Flammable Gases**
- **Improper access**
- **Slip trip and fall**

<u>Excavation Safety Precautions:</u>

- **Excavation clearance certificate required if more than 10cm depth**

- **Protective measures to be taken to protect against cave in such as sloping and benching**

- **Additional protective measures required if excavation is more than 1.2 meter such as sloping benching,shoring and shielding**

- **Excavated material should be kept away atleast 1 meter away from excavation**
- **Heavy equipment should be kept away atleast 2 meter away from excavation**
- **Gas testing to be done by the operation prior performing the activities to check the flammable ,toxic and oxygen level**
- **Proper access and egress should be provided to the workers**
- **Proper Tools and material arrangement to prevent trip snd slip hazards**

<u>Notes Related to crane</u>

- **Anti tube block/limit switch: An anti-two-block system is a safety feature on cranes that prevents the hook block and load block from colliding. It uses a limit switch that triggers when the hook block is raised too high, sending a signal to the crane's control system to stop the hoist and prevent the collision. It is an essential safety feature required by law in many jurisdictions.**

55.CRANE HAZARD AND PRECAUTIONS

- **Load falling: When lifting a load, there is a risk of it falling, which can cause injuries to people and damage to property.**

- **Hitting and crushing: Loads can swing and collide with existing facilities, causing damage or injury.**

- **Crane toppling: If the crane is not properly set up or overloaded, it can topple over, potentially causing serious injury or death.**

- **Environmental factors: High wind speed, poor communication, and poor visibility can also contribute to crane accidents.**

- **Damage to underground utilities: When moving heavy loads, there is a risk of damaging underground utilities or other infrastructure, which can be costly and dangerous.**

- **Electrical hazards: When working near power lines or electrical equipment, there is a risk of electrocution, which can be fatal.**

- **Inadequate training: Operating a crane without proper training and certification can result in accidents and injuries.**

- **Equipment failure: Equipment failure can occur due to a lack of maintenance or faulty parts, leading to accidents and injuries.**

- **Human error: Accidents can also occur due to human error, such as miscommunication or improper use of equipment.**

<u>Precautions</u>

1. **Ensure to have a valid lifting work permit and JSA for the activity**
2. **Lifting plan should be available for the activity**
3. **Certified crane operator and rigger as per lifting plan shall be available**
4. **3rd party certified lifting tools ans shackles shall be used and color coded as per client requirement**
5. **Check and level ground conditions: Before operating a crane the soil or ground conditions should be checked and leveled to ensure stability and prevent accidents.**
6. **Use appropriate spread mate size: A spread mate size of 1:3 should be used to ensure that the load is evenly distributed and the crane is stable.**
7. **Fully extend outriggers: The outriggers should be fully extended and at least 1 meter away from manholes and trenches to provide maximum stability and avoid accidents.**

8. **Do not overload: Always lift up to the safe working load (SWL) and avoid overloading the crane as this can result in equipment failure and accidents.**
9. **Avoid adverse weather conditions: If wind speed is more than 32 km/per hour lifting activity cannot be performed**
10. **Barricade the swinging radius: The swinging radius of the crane should be barricaded, and only trained and certified riggers should be allowed in the area.**
11. **Wear appropriate personal protective equipment: Riggers should wear jackets or other appropriate personal protective equipment.**
12. **Proper communication protocols: The only rigger should give signals to the crane operators, and a minimum of two tag lines should be used to control the swinging of the load. Miscommunication or misunderstanding of signals can result in accidents and injuries.**
13. **Barricade the area to prevent unauthorized entry in an barricaded area**
14. **Use appropriate hitching methods: Straight, basket, and choker hitching methods should be used to secure the load properly and prevent accidents.**
15. **Reverse beep horn: The crane should have a reverse beep horn to alert workers and prevent accidents while the crane is in motion.**
16. **Regular inspections and maintenance: Regular inspections and maintenance of the crane and its components can help to identify any issues that may increase the risk of accidents and prevent equipment failure.**
17. **Flagman/Rigger shall be available while reversing the crane**

56. VENTILATION RATE CALCULATION

$$\frac{\text{Capacity of ventilation}}{\text{Volume of equipment}}$$

Note : ventilation cycle should be 20 cycle per hour

57.HOW TO MAKE SURE VENTILATION RATE IS ACHIEVED AS PER VENTILATION PLAN

- **As per ventilation plan air mover shal be placed as per air mover specification**
- **Number of air mover placed on the equipment as per ventilation plan**

58.LSR RULES

1. **Safe system of work**
2. **Confined space entry**
3. **Working at height**
4. **Lifting operation**
5. **Line break**
6. **Energy isolation**
7. **Creating opening**
8. **Disabling safety system**
9. **Vehicle safety**
10. **Mangement of change**

59.CONFINED SPACE HAZARD AND PRECAUTIONS

<u>Hazards</u>

- **Oxygen deficiency**
- **Toxic gases**
- **Flammable gases and vapor**
- **Fire and explosion hazard**
- **Engulfment hazard**
- **Poor ventilation**
- **High temperature**
- **Slip trip and fall**
- **Poor illumination**
- **Static electricity**
- **Fall of material from the access area**
- **Unauthorized person entering the confined space**

<u>Precautions</u>

- **Ensure a have a valid confined space permit and activity work permit**
- **Ensure isolation of energy source and lock out and tag out done for the equipment**
- **Ensure equipment is drained and vented and blinding and physical disconnection done for the equipment**
- **Gas testing is done by the operation and gas monitor should be available with the standby man and gas monitor with the entrant (one entrant should carry for every 4 person)**
- **Ensure Inspected 24v light lamp with GFCI shall be provided in a sufficient number**
- **Ensure Inspected 110v for using the power tools with GFCI shall be used**
- **Standby man should be available with reflective vest with entry log sheet and air horn**
- **Air mover shall be placed as per approved ventilation plan**
- **Rescue plan shall be available at site and followed**
- **JSA should be available with the work permit and followed**
- **Electrical layout plan shall be available at site and comply**
- **Proper supervisor should be available at work site**
- **Every person entry into the confined space will put the personal lock and tag on the satellite box and keep the key with each employee and remove the lock when person coming out of confined space**
- **Air mover shall be earthed to prevent static electricity**
- **Emergency safety torch should be available with standyman**
- **All the electrical line up and hoses line up shall be made in proper wsy to prevent slip trip and fall hazard**
- **Access and egress should be in proper way and ladder should be visually inspected prior to use**
- **All the entrant should be well aware about the hazard and precautions as per JSA**
- **Only the trained person are allowed to enter the confined space**
- **Barricade the area to prevent the unauthorized person**

60.HOT WORK HAZARD AND PRECAUTIONS

Fire hazards posed by hot work include

- **Flying sparks due to the grinding activities**

- Exposure to fumes and gases
- Fire and explosion hazard
- Exposure to electrical hazards
- Heat exposure
- Electrocution
- Slip trip and fall
- Noise hazard
- UV radiation exposure due to welding activity

Precautions

- Ensure to have a valid hot work permit
- Ensure the equipment or line is deenergized the energy source drained and vented and ensure zero percent energy in the equipment
- All the combustible and flammable materials shall be removed from the 10 meter raduis
- Gas testing shall be done by the operation prior performing the activity
- Fire watch shall be available during the hot work activity
- Fire blanket shall be placed to contain the sparks
- All the drain line shall be placed fire blanket in the radius of welding machine and workplace.
- Personal lock shall be done by the employee in the loto box prior performing the activity
- Proper supervising for the activity
- Welding machine shall have 3rd party certificate and valid inspection sticker of the client
- Earthing shall be done for the equipment
- Welding machine shall be inspected and maintain checklist for the equipment prior performing the activity
- Welding checklist shall be done prior performing the activity
- Certified welders and fabricator shall only perform the activity
- Cables shall be visually checked for any damaged.

61.WHAT UEL

The highest concentration of a gas or vapor (percentage by volume in air) above which a flame will not spread in the presence of an ignition source (arc, flame, or heat). Concentrations higher than UEL are "too rich" to burn. Also called upper flammable limit (UFL).

62.HIERACHY OF CONTROL

The hierarchy of controls is a method of identifying and ranking safeguards to protect workers from hazards. They are arranged from the most to least effective and include elimination, substitution, engineering controls, administrative controls and personal protective equipment.

63.SCAFFOLDING CAPACITY

LIGHT DUTY-	**25 Pounds /Sq feet**	**150 kg/Sq meter**
MEDUIM DUTY	**50 pounds /sq feet**	**200kg /sq meter**
HEAVY DUTY	**75 pounds /sq feet**	**250 kg /sq meter**

64.STANDARD OF PPE

ANSI Z 87.1 SAFETY GLASS
ANSI Z 89.1 SAFETY HELMET
ANSI Z41.1 SAFETY SHOE

65.EMERGENCY RESPONSE IN CASE OF EMERGENCY

- **Stop the job**
- **Stop the equipment and alert the person in the area**
- **Check the wind direction by seeing the wind sock**
- **Go in a cross wind direction and go to the nearest safety assembly point**
- **In case of gas release go to the enclosed building**

66.ROLES OF SAFETY OFFICER

- **To conduct the daily safety tool box meeting with an employee to aware about the hazard of the work activity and precautions to be taken at site**
- **To inspect the work site and monitor the employee for any unsafe act and condition**
- **To ensure employee working as per the work permit and JSA requirement**
- **To ensure equipment using at the site are inspected and have valid inspection sticker**
- **Ensure color code the tools as per client requirement**
- **To inspect the fire extinguisher monthly**
- **To ensure employee are well ware about the hazard and precautions at the work site**
- **To ensure employee are well awre about the emergency response plan**
- **To record and report daily observation with corrective action and share with the higher mgt and share in daily toolbox talk**

67.SAFETY ANGLE OF CRANE

- **45 degree**

68. UNSAFE ANGLE OF CRANE

- **65 ,70 and 80 are unsafe angle of crane**

69.WHAT IS FLASH BACK ARRESTOR

A flashback arrestor or flash arrestor is a gas safety device most commonly used in oxy-fuel welding and cutting to stop the flame or reverse flow of gas back up into the equipment or supply line.

70.TYPES OF SCAFFOLDING TAG

- **Red tag**
- **Green tag**
- **Yellow tag**
-

71.TYPES OF SCAFFOLDING

1. **Cutlog scaffolding**
2. **Mobile scaffolding**
3. **Cantilever scaffolding**
4. **Suspended scaffolding**
5. **Trestle scaffolding**
6. **Patended scaffolding**

72. WHAT IS THE WIND SPEED AT WHICH CRANE CANNOT PERFORM THE ACTIVITY

32 km/hr 9 meter /second

73. WHAT DOCUMENT REQUIRED TO PERFORM ACTIVITY IN CONFINED SPACE

- **Valid confined space permit and activity work permit**
- **JSA/Risk assessment**
- **Ventilation plan and rescue plan**
- **Electrical layout plan**

74. WHAT DISTANCE FLAMMABLE GASES SHALL BE STORED AWAY FROM THE FLAMMABLE LIQUID – 7.5 meter

75. WHAT IS PEL,TLV LIMIT

- **OSHA sets permissible exposure limits (pels) to protect workers against the health effects of exposure to hazardous substances. Pels are regulatory limits on the amount or concentration of a substance in the air.**
- **The threshold limit value (TLV) is believed to be a level to which a worker can be exposed per shift in the worktime without adverse effects. Strictly speaking, TLV is a reserved term of the American Conference of Governmental Industrial Hygienists (ACGIH).**

76. IDLH ATMOSHERE

IDLH or Immediately dangerous to life or health means an atmospheric concentration of any toxic, corrosive or asphyxiant substance that poses an immediate threat to life or would cause irreversible or delayed adverse health effects or would interfere with an individual's ability to escape from a dangerous atmosphere.

77. TYPES OF RESPIRATOR

There are two main types of respiratory protection—air-purifying respirators (aprs) and atmosphere-supplying respirators (asrs). Each respirator type provides a different level of protection based on its design.

78.INERT ENTRY

- **One of the most dangerous confined space entries is when an inert atmosphere is present. Inert or "non-reactive" atmospheres are used to displace oxygen or other reactive gases when the presence of that gas presents an explosion risk to either the process being performed or the compounds being stored.**

- 4**% Oxygen**
- **In the case of inerted atmospheres, a space which must be entered, the Lower Explosive Limit should be maximum of10%, and a maximum of 4% Oxygen to prevent fire or explosion.**

79.WHAT IS CATAYST AND HOW TO HANDLE CATAYST HANDLING

A substance that increases the rate of a chemical reaction without itself undergoing any permanent chemical change.

80.EARTHING,GROUNDING AND BONDING

Earthing is primarily used to avoid electric shocks. Grounding is primarily used for unbalancing when the electric system overloads

Bonding is used to reduce the risk of electric shocks to anyone who may touch two separate metal parts when there is a fault somewhere in the supply of electrical installation.

81.WHAT IS GFCI

- **The ground-fault circuit interrupter, or GFCI, is a fast-acting circuit breaker designed to shut off electric power in the event of a ground-fault**

82.AT WHAT CURRENT PERSON CAN CAUSE HEART FIBRILLATION OR DEALTH?

- **50 TO 150 AMPS**

83.REVERSE POLORITY OF WELDING

- **When the electrode is positive and the plates are negative, this results in direct current reverse polarity.**

84.REQUIREMENT FOR GRATING OPENNING

- **Grating removal form shall be filled and approved maintenance and approved by operation manager**

85.SHE CRITICAL EQUIPMENT ISOLATION PROCEDURE

Proper approval is required prior to isolation of SHE critical equipment

86.<u>PERMIT ISSUER RESPONSIBILITY</u>

- **Hazard Assessment and control Form and all work permit sections are signed by designated positions written in Work Permit forms.**
- **The equipment and area are prepared and it is safe to perform the work.**
- **Process Isolation (valves are closed, blinds are installed, lines are disconnected and vent / drains are opened) of the equipment as required for the assigned work as per Control Isolation of Hazardous Energy including LOTO procedure (OMS-316.11).**
- **Electrical LOTO obtained/ followed (e.g. Power De-energized) as per LOTO certificate requirement according to Electrical Safety procedure (OMS-316.05) and Control Isolation of Hazardous Energy including LOTO procedure (OMS-316.11).**
- **Gas test conducted for all permits as required with considering the allowable concentrations & safe ranges.**
- **Identify hazards associated from surrounding area, including potential for exposure to Heat and Cold Stress procedure (OMS-3110.06) and appropriate actions, including communication, ppes, and other administrative and engineering measures taken for the safety of personnel who will carry out the assigned task.**
- **Joint site visit (where the work is to be performed) is carried out along with the Permit Receiver of the Work permit for the area and equipment, before the Work permit is issued, to assure that the conditions and precautions are satisfactory for the work to proceed and to indicate the nearby eyewash, emergency shower, fire extinguisher and paging system.**

- **The Permit Receiver understands the requirements, ppes to be used,**
- **Use other precautions given in the Work permit \Hazard assessment and control Form and any potential of unusual conditions related to the job.**
- **After completion of work, Work permit is closed before re-starting the equipment on which the work was performed and cosigned with issuer.**
- **The Issuer of the work permit shall inform the concerned supervisor(s) of all the area/dept. That may affected by work and obtain their initial on the work permit.**
- **The issuer of the work permit shall convey relative information about the issued work permit to his reliever.**
- **The Permit Issuer shall assign concerned area operator to monitor the activity of work permit within his boundary.**
- **The Permit Issuer shall keep the original copy in control room.**
- **In case Permit Issuer has to leave his shift for any valid reason, he has to delegate the responsibility to another "Permit Issuer" of equivalent authority or above to carry out the responsibilities and make endorsement.**
- **The Permit issuer is responsible for the area where the Work permit is issue.**
- **Issuer shall not issue the permit with validity beyond his working hours.**
- **Permit issuer shall notify the receiver and / or the work crew on conditions change and an evaluation be made as to revoking, revising, or reissuing of the permit**

<u>Permit receiver responsibility</u>

- **The job was understood as what, where and how to be performed.**
- **His entire crew is qualified to perform the activity as per Training & Competencies procedure**
- **Comply with all the requirements and precautions stated in the Work Permit.**

- **Availability of standby-man and fire watch whenever permit issuer mentions in work permit form. Electrical, Steam, Pneumatic and/or any other type of LOTO, as required, is performed.**
- **Communicate any change in the condition or any abnormality observed to the Permit Issuer. Housekeeping is maintained before, during and after job.**
- **Permit Receiver shall conduct the "LMRA" Last Minute Risk Assessment method which is used to help executers to think and implement safety precautions before any job is started. Means to take two minutes before starting any job to think about (thinking before acting) and applying crew member group Lock-Out Tag-Out before starting the job.**
- **"LMRA" assessments are carried out in the field prior to starting any tasks/ jobs by the people doing the work.**
- **To leave his shift for any valid reason, he has to delegate the responsibility to another "Permit receiver" of equivalent authority or above to carry out the responsibilities. New delegate shall sign the forms and make endorsement.**
- **The permit hard paper copy is available at the worksite or preferably is displayed at a visible location near the worksite, until the job is completed.**
- **To attend to next shift issuer for extension or closing the work permit as required, work shall not be resumed or Confined space re-entry made until this has been accomplished.**
- **Close the work permit after completion of the job immediately and not having a gap in time unless proper extension done.**
- **Close the work Permit by same issuer and receivers unless it is closed by their relievers after doing endorsement/and extension in one-hour shift change. Note: After signatures from the Issuer and the Receiver, each one shall keep a copy of the Work Permit.**

87.HYDROJETTING HAZARD AND PRECAUTIONS

Typical hazards will include the following:

- **High pressure**
- **Cut injury**
- **Chemical exposure**

- **Exposure to hot water while performing the hydro jetting**
- **Dislodged of hoses**
- **Static electricity**
- **Slip trip and fall hazard**
- **Unauthorized person entering the area**

<u>Precautions</u>

- **Ensure to have a valid work permit for the activity**
- **Hydro jetting checklist shall be done prior performing the activity**
- **Earthing shall be done for the hydro jetting machine**
- **Ensure to have a 3rd party certificate for the hydro jetting pump and should have a valid sticker from the client**
- **Ensure 3rd party certificate shall be available for the hydro jetting hoses and visually inspect the hoses**
- **Ensure trigger safe is in good condition for the hydrojetting gun**
- **Ensure 3rd party certified hydrojetter**
- **Ensure proper communication between the hydrojetter , pump operator and middleman**
- **Barriacde the hydrojetting area with signboard**

88.WHAT INFORMATION IS AVAILABLE IN RESCUE PLAN

Plant/Unit: 2100		Location: PE3/4	Equipment Tag# 3C-2121
SN	Requirement	Details of Arrangement	
1	Confined space / High elevation work are / High risk area details	Provide adequate ventilation, Eliminate hazardous atmosphere prior to entering the confined space. Standby man must maintain a record of all persons entering / exiting at each entry or exit.	
2	Means of access (Manhole / channel head open / pit cover)	All column opened manholes	
3	Lightning requirement	24V	
4	Internal obstructions	Visual inspection and cleaning, tools must be arrange.	
5	Height from ground	from manhole TO tray 1M height and from ground 12M	
6	Pre-installed rescue equipment such as first aid kit, stretcher…. details	Install anchor point with Life rope to be connected during working.	
7	Supplied-air or self-contained breathing apparatus	Ejectors prepared for air ventilation to get enough O2 concentration inside the column, provide O2 pocket and provide two SCBA outside to be ready if need in case of emergency.	
8	Safety Harness requirement	Required to use it during confined space	
9	Maximum number of persons inside the confined space		
10	Communication Tools such as Air horn, radio, audible signal, rope signal or any other type of emergency horn with workers in confined space	Standby man with Air horn	
11	Mechanical Device on-site for immediate use to retrieve the personnel from vertical type confined spaces more than 2 meters deep	Rescue tools ready for immediate use in case of emergency.	
12	Role of Control Room Operator	Coordinate with permit issuer & fire captain in case of emergency.	
13	Role of Permit Receiver	Monitor the job & communicate with operation.	
14	Define escape route or attach escape plan	Column manhole	
15	Notify to Fire Captain/Fire Manager before start work (Record in the backside)	Inform fire captain before start activity	

89. WHO IS RECEIVE THE CONFINED SPACE PERMIT

Certified direct hire supervisor

90. WHY CO2 IS USING FOR ELECTRICAL FIRE

CO2 fire extinguishers are mainly used on electrical fires in as the CO2 does not leave any residue and does not damage computers

91. WHAT CONTENT IS AVAILABLE IN ACCIDENT REPORT

SAMPLE

Type of Incident	Non-fatal
Date and time of when the incident occurred	14th Apr, 2021 10:30 AM PST
Location of incident (be specific as possible)	
The incident occurred on warehouse 3 of compound 1-A in Blaxland Site	
What was the work being done?	Warehouse packaging
Describe the incident	
Employee was moving crate packaging when the forklift malfunctioned and bumped towards the other crates.	
Attach or take photo of surrounding environment including any annotations	

92. GASES LEVEL IN CONFINED SPACE

- **Oxygen level – 19.5 – 23.5 % in volume**
- **Carbon monoxide – 25 PPM**
- **H2S – 1.0 PPM**
- **LEL 0 % IN VOLUME**

Note: PPM – Parts per millions – PPM is Used to express the concentration of a substance which is present in less amount.

93. WHAT IS LINE BREAK AND HAZARD AND PRECAUTIONS DURING THE LINE BREAK

The first time opening of a pipe, line that contains hazardous material.

<u>Hazards</u>

- **Exposure to store energy**
- **Fire and explosion hazard**
- **Personnel exposure to chemical**
- **Chemical splash to employee**
- **High pressure**
- **High temperature**
- **Unauthorized person entering the area**
- **Chemical spillage**

Precautions

- **Ensure to have a valid work permit for the activity**
- **Ensure energy isolation shall be done for the energy sources and completely vented and drained to ensure zero percent energy in the line**
- **Employee involved in the activity will put personnel lock with tag in the satellite box prior performing the activity**
- **Gas test shall be done prior performing the activity to ensure zero percent**
- **Operation shall be available in the site before performing the activity**
- **Dip tray available to contain the chemical to prevent environmental hazard**
- **Always ensure the flange bolt shall be open from bottom**
- **Inspect the tools and color code prior using at site**
- **Barricade the aree to prevent unauthorized person**

WHO WILL VERIFY THE LOTO

LOTO authorized person will verify the LOTO to ensure zeo percent energy

VENTILATION PLAN CONTENT

Classification: Confidential

FM-VD01-290	Company Name MANAGEMENT SYSTEM	
Rev. No.: 02	Ventilation Plan	الرازي ar-razi
Date:		
Page 1 of 4		

Plant Name	AR-RAZI PLANT-V	Date: 22/10/2023
Equipment Tag No	U-5600-V1A/V1B	
Equipment Name	ACTIVATED CARBON FILTER	
Equipment Volume (V)	26.7M^3	

The ventilation rate inside the confined space including the ventilation rate in the breathing zone shall be **20 complete air changes per hour (one cycle every 3 minutes)**

$$\text{Ventilation rate (VR)} = \frac{\text{Ventilation Capacity (C)}}{\text{Volume of Equipment (V)}}$$

Sr. No.	Ventilation Device Fan/ Blower	Number of Device	Capacity of each device in M3/hrs.	Total Capacity M3/hrs.
1	BL1200	01	2091@60 PSI	2091

Ventilation Rate (VR) = 2091/26.7 = 78 Cycle/Hr.

RESCUE PLAN CONTENT

Doc. No.: FM-VD01-263	SHEM08.10 MANAGEMENT SYSTEM	الرازي ar-razi
Classification: Internal Use Rev.:03		
Date:	RESCUE PLAN	
Page 1 of 2		

Plant/Unit: Plant -V **Location:** REFORMER SECTION **Equipment Tag#** E-5205-1B, Side Manway

SN	Requirement	Details of Arrangement
1	**Confined space / High elevation work are / High risk area details**	**Confined space for refractory removal/installation, cleaning and inspection.**
2	Means of access (Manway / channel head open / pit cover)	Side Manway
3	Lightning requirement	Yes (24 v)
4	Internal obstructions	No
5	Height from ground	2.5mtr from ground level.
6	Pre-installed rescue equipment such as first aid kit, stretcher…. details	Lifeline rope with hook
7	Supplied-air or self-contained breathing apparatus	SCBA in case of emergency (only ERT team is authorized to use)
8	Safety Harness requirement	Yes, Without Lanyard
9	Maximum number of persons inside the confined space	Max 2 workers inside the confined space
10	Communication Tools such as Air horn, radio, audible signal, rope signal or any other type of emergency horn with workers in confined space	Stand by man shall be equipped with Air horn, so in case of emergen he can raise alarm and communicate with the entrants.
11	Mechanical Device on-site for immediate use to retrieve the personnel from vertical type confined spaces more than 2 meters deep	NA
12	Role of Control Room Operator	Call Incident Commander in case of emergency
13	Role of Permit Receiver	Call CCR in case of emergency
14	Define escape route or attach escape plan	Escape through side Manway
15	Notify to Fire Captain/Fire Manager before start work (Record in the backside)	Inform fire captain
16	Is Rescue Man required? ☐Yes ☐No	No

- **Above Confined space requirements can be covered by Plant Owner Safety watch:** ■ Yes ☐ N/A
- **Based on above analysis, Does Safety watch required to be ERT, while preforming the duty:** ☐ Yes ■ No

Person	Name	Authorized WP No.	Signature	Date	Tim
Permit Receiver Supervisor					
Permit Issuer Supervisor					
Approval					
Fire Shift Supervisor (Fire Captain)					
Re-Validation					
Fire Shift Supervisor					

JSA CONTENT

OPERATIONS MANAGEMENT SYSTEM	SHEM-02.02 OMS 311.02	الرازي ar-razi
SAFER - Health and Safety Risk Assessment Attachment 1.1: JSA Form	Rev. No. 01 15-July-2023	
	Page 1 of 14	

JOB SAFETY ANALYSIS (to be filled out by Operations/Maintenance Staff or Group Leader together with JSA Team Members)		
Area: PLANT-V, REFORMER AREA	Job Description: To do Isolation, Opening & Reinstallation of Exchanger cover, spool, Nozzle, Elbow, channel head, lifting activities, Removal and Installation of Tube Bundle, Hydro jetting, Manual cleaning, Vacuuming, Air blowing, Hot work-related Activities and Inspection.	
Job Location: **E-5232**	Ref. Number: JSA-OP3-TAM-100	Mention Applicable Procedures: As per SHEM
Maint/Ops. Staff/Group Leader: Dept:		Use additional sheets if necessary.
Name & ID: Date:		Attachments: YES / NO If YES state number of pages:

No.	Job Steps	Potential Hazards	Risk Level	Steps to Reduce Hazard	Remaining Risk Level

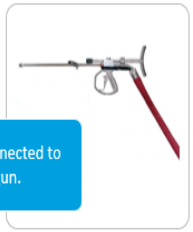
Risk matrix

SABIC RISK MATRIX - DETAILED

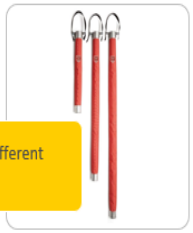
sabic

		EHSS (Based on SHEM 10)					Likelihood				
							L5	L4	L3	L2	L1
							Probability per annum (Operational)				
							<0.01%	>0.01%-0.1%	>0.1- 1%	>1 – 10%	>10%
							Frequency				
							The scenario is not foreseen to occur and is not recorded in the industry	The scenario may occur in exceptional circumstances but has been recorded in similar industry	The scenario has occurred in SABIC or has happened more than once per year in similar industry	The scenario has happened once before at the location / site or more than once per year in SABIC	The scenario is almost certain to occur and has happened several times per year at the location / site
							Very Unlikely	Unlikely	Possible	Likely	Very Likely
Consequence	C1	>10M	Regional media coverage over multiple days Or Global media coverage	Multiple fatalities to employees/ contractors or public fatality	• Chemical release > 20 Times the TQ. PSI Level 1 only Chemical Impact and/or • All Class A incidents other than Injury/Illness, Security, Financial or Reputation Consequences	Very High	2 C1-L5	2 C1-L4	1 C1-L3	1 C1-L2	1 C1-L1
	C2	>1-10M	National media coverage over multiple days Or Single regional media coverage	Fatality or multiple lost workday injuries to employees/ contractors or public injuries	Chemical release between 9-20 Times the TQ. PSI Level 2 only Chemical Impact	High	3 C2-L5	2 C2-L4	2 C2-L3	1 C2-L2	1 C2-L1
	C3	>100K-1M	Local media coverage over multiple days Or Single national media coverage	Lost workday injuries to employees/ contractors	• Chemical release between 3-9 Times the TQ. PSI Level 3 only Chemical Impact and/or • All Class B incidents other than Injury/Illness, Security, Financial or Reputation Consequences	Moderate	4 C3-L5	3 C3-L4	2 C3-L3	2 C3-L2	1 C3-L1
	C4	>10K-100K	Single local media coverage	Medical treatment to employees/ contractors	• Chemical release between 1-3 Times the TQ .PSI Level 4 only Chemical Impact and/or • All Class C incidents other than Injury/Illness, Security, Financial or Reputation Consequences	Low	4 C4-L5	4 C4-L4	3 C4-L3	2 C4-L2	2 C4-L1
	C5	<10K	Only internal communications	First aid to employees/ contractors	• Chemical release not meeting the TQ.....PSI NA • All Class D incidents other than Injury/Illness, Security, Financial or Reputation Consequences	Very Low	4 C5-L5	4 C5-L4	4 C5-L3	3 C5-L2	3 C5-L1

GENERAL HPWJ ACTIVITIES SAFETY TIPS



Shroud connected to HP jetting gun.



Shrouds (different lengths)

Complete Human Body Protection for HP Jetting

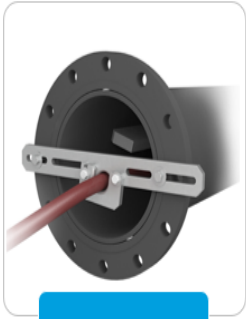
1. Carry out an inspection of all high pressure jetting equipment and components before executing any hydro jetting activity.
2. The work area must be clearly identified and controlled with effective signage and physical barrier to restrict access to authorized workers only.
3. Hydro jetting supplied hoses must be connected by means of properly rated couplings in place and shall have a Shroud for gun. Houses must be connect by whip checks.
4. All high pressure equipment shall be grounded before work starts and during operation, to prevent the development of electrostatic charges between the lance and the workplace.
5. Jetting operations should not be performed from ladders or other surfaces not intended for use by workers, as this can lead to loss of control of the jetting equipment.
6. All high pressure equipment shall be isolated and depressurized before being left unattended.
7. Trigger hold devices (Dead Man's Switch) shall be checked and confirmed that it is functional before starting the jetting activities.
8. Never use the jetting gun as a pry bar or in any other means that would cause excessive stress on any part of the gun.
9. Never modify the jetting gun. Only a manufacturer's authorized modifications are acceptable.
10. Never use a device or tool to hold down the trigger on a jetting gun. The trigger must always be operated by hand only.

Classification: Internal Use

MINIMUM REQUIRED PPE FOR HPWJ ACTIVITIES

PPE TYPE					
BODY PROTECTION	FOOT PROTECTION	NECK PROTECTION	HAND PROTECTION	HEAD & HEARING PROTECTION	EYE PROTECTION
REQUIREMENTS	REQUIREMENTS	REQUIREMENTS	REQUIREMENTS	REQUIREMENTS	REQUIREMENTS
Overall body protection as per the operating pressure.	360-degree Gaiters and non-skid soles.	This should be used as a complementary piece to the suit that is extended to the top side of the neck.	This shall be used with available mounted hand protection in the suite, It shall be suitable for high pressure rating activities as per EN-388.	Helmet meets SS-EN397:2012 penetration test pass and ear muffs.	Safety glasses and face shield.

GENERAL HPWJ ACTIVITIES SAFETY TIPS



Tube back-out Preventer

11 Detailed procedure shall be available at site for high pressure cleaning activities.

12 Back out preventer shall be installed at the pipe entrance to prevent the nozzle on the end of the hose from being pulled out of the pipe under pressure.

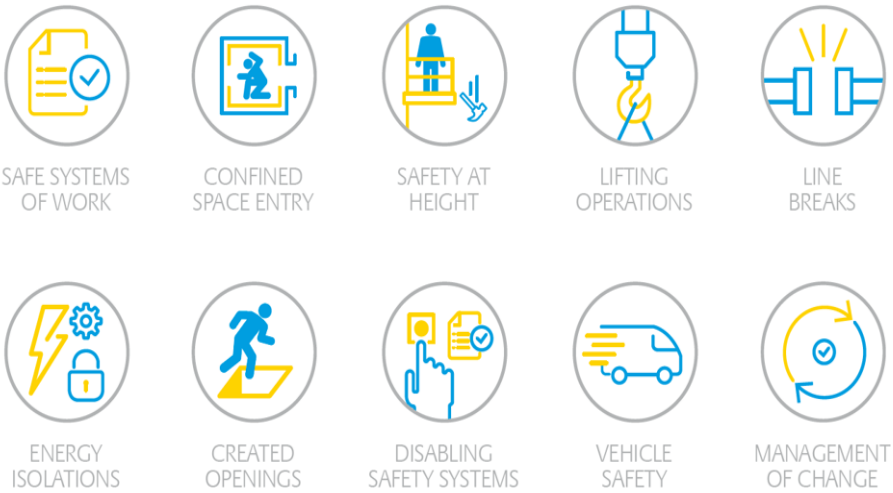
13 High pressure cleaning machines shall be fitted with dry shutoff control valve to maintain the system within the maximum desired working pressure.

14 Hydro-jetting activities shall be monitored and in case of any non-compliance to any requirements, the job shall be stopped immediately.

15 There shall not be any attempt to repair any failing hose, connectors or fitting related to high pressure equipment at the site.

LIFE SAVING RULE

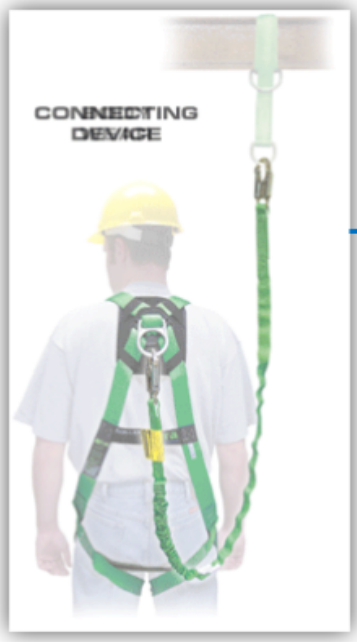
SABIC Life Saving Rules (LSR) aim to help employees and contractors to understand and recognize the hazards and comply with these rules covering life critical activities that are undertaken during operations or Maintenance Activity.



General Requirement for Working at Height:

- ❑ Lanyards and drop lines/lifelines attached to the Safety harness shall be secured.
- ❑ These shall be secured in a manner to limit falls to less than two feet (0.61 m) and must be capable to withstand a load of 2455 kilos (5400 lbs.)

General Requirement for Working at Height:



Fixed Anchorage Point:
A secure point of attachment above head height, for drop lines and lanyards, capable of supporting a minimum static load of 2455 kilos (5400 lbs.)

While anchoring following need to consider:

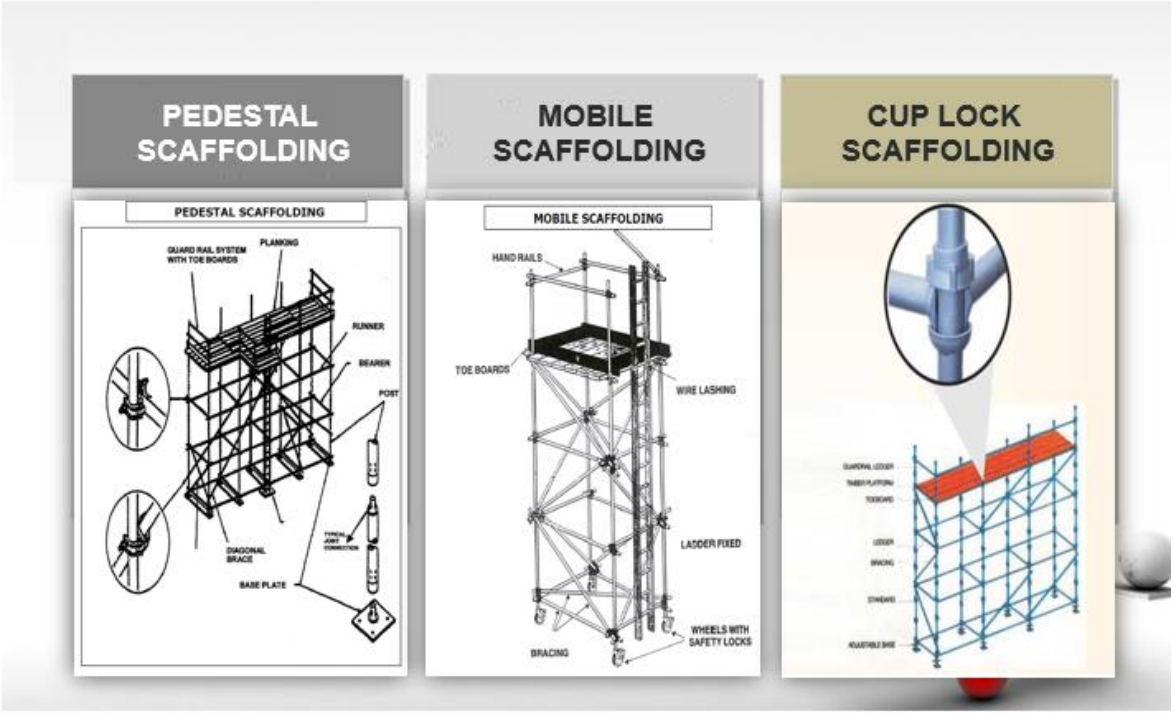
- Process pipeline should not be used as far as possible.
- Still need to use process pipeline, its diameter should be at least 10 cm.
- Insulated pipe shall not be used.
- Aluminum piping shall not be used.
- Extreme cold and extreme hot temperature piping should not be used.
- Elbows, tees and small bore connection shall not be used

Straight & Extension Ladders:

Single Ladder longer than 9.0 meter shall not be permitted to use.

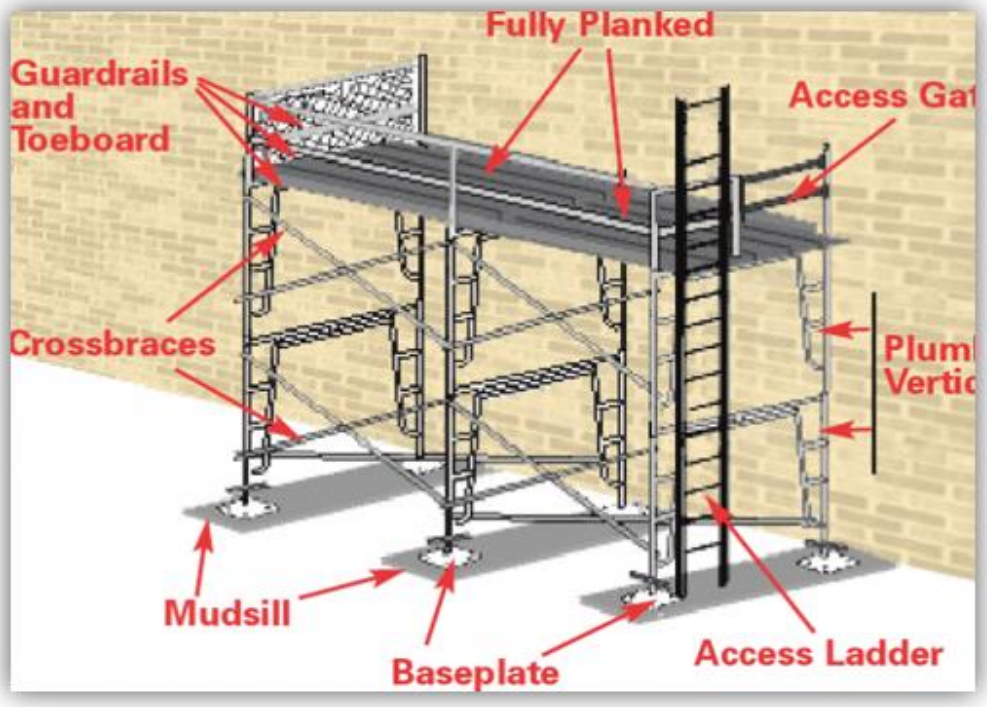
Straight Ladder shall be set against the wall (support) at a **four to one ratio. (4:1)**

Type of Scaffolding:



Scaffolding Components:

- Following are the main component of Scaffolding.



Scaffolding Inspection Tag:

WARNING
AUTHORIZED PERSON :
DATE
SIGNED
LADDER No RUNGS :
No OF STANDARDS :
No OF LIFTS :
M² BOARDING :
STRUCTURE DECOMMISSIONED
DATE :
Yellow Scaffold Tag (on Scaffold had been inspected and is structurally strong & safe but some fall protection (guiderails, mid rails etc.) are missing. Anybody use this scaffold must wear and hook Fall Protection system (Fall Body Harness, etc.) during the use.

Mobile Scaffolding:

- Caster are always locked when the scaffolding is in use.
- No person, tools or equipment shall be remain on scaffolding when it is being moved.
- Adequate clearance from overhead pipe lines and electrical cable shall be maintained when is moved form one place to another.

GENERAL RULSE FOR GRATING REMOVAL & INSTALLATION

1. No floor grating is to be removed without notifying the Area Supervisor in-charge

2. Obtain a separate safe work permit for grating removal and Job Safety Analysis shall be conducted.

3. Never remove or leave a piece of grating out without first installing a rigid barricade, guardrail or equivalent, which will entirely encompass the opening, or properly cover the opening.

4. Flash and warning lighting system must be provided in the dark areas especially during Nights.

5. Operation Shift Supervisor shall ensure that the Steel Grating & Floor Plates conditions were returned to original state.

6. For grating removal, the following requirements shall apply as per applicable:
   1- Covers to be utilized.
   2- Rigid barricading or guardrail to be used.

Serial No. _____

sabic

GENERAL WORK PERMIT

PART A: LOCATION OF ACTIVITY (RECEIVER)

Department / Unit: PC Date: 16-11-20 No. of worker: 03

Work Location: TR #1.

Equipment / Item: Valve 95529

PART B: WORK TO BE DONE (RECEIVER)

Work to be done (Including Method/Equipment/Substances/Limitations) Replace Valve on 5 bar Pressure.

PART C: PERSONAL PROTECTIVE EQUIPMENT (RECEIVER)

☐ Goggles	☑ Leather Gloves	☑ Face Shield
☑ Ear Protection	☑ Dust Mask	☐ Others _____
☐ Life Line	☐ Full Body Harness	☐ Others _____

PART D : (WORK SITE PREPARATION) (ISSUER & RECEIVER)

	Descriptions:	YES	N/A
1	Ensure LOTO is performed? Certificate #. 11029	☑	☐
2	Manholes, catch pits/basins, sewer connections are covered?	☐	☑
3	Process vents & manhole vents direct away from work site?	☐	☑
4	Work area barricaded Warning sign and Fence.	☑	☐
5	Will this work affect operations or other maintenance jobs within 15m radius?	☐	☑
6	SDS data required in work location, if exposed to hazardous chemicals	☑	☐
7	Ensure grating guardrail in place and secured properly	☐	☑
8	Ensure tools and equipment are inspected by user	☑	☐
9	Hazard Assessment and control completed: ☑ Yes Doc.#_____ (If Formal JSA required, JSA Form #.:_____)		
10	Does The Activity Required Special Tool to be used ☑ Yes ☐ No (Specify_____:_____:_____:_____)		

Gas Tester

Test: ☑ YES ☐ N/A If Yes - Frequency _____ hr. Or ☐ Continuous (Gas Meter Device. #. _____)

Time	Oxygen	LEL	CO	CO2	H2S	-	-	Name	Auth. No.	Signature
	20.8%	0%	25 PPM	5000 PPM	1.0 PPM	PPM	PPM			

Authorization (After Joint Site Visit)

Affected Area Counter Sign by supervisor or above ☐ YES ☑ N/A (ISSUER)

Plant:_____ Name:_____ Signature:_____ | Plant:_____ Name:_____ Signature:_____

Authorization (After Joint Site Visit)

Time Issued From: _____ To: _____

Permit Issuer	Permit Receiver
I have checked & certify that the conditions & precautions required are as stated & work can be carried out safely.	I hereby accept the stated conditions & precautions for the work to be done safely and perform before starting the job.
Name: _____ ID No. _____	Name: _____ ID No. _____
Authorization No.: _____ Signature : _____	Authorization No.: _____ Tel. No. _____
Area Operator Informed (Name):_____ (ID.#.):_____ signature:_____	Signature : _____

Extension / Endorsement

☐ Extension ☐ Endorsement

Permit Issuer: I have checked & certify that the conditions & precautions required are as stated & work can be carried out safely.					Permit Receiver: I hereby accept the stated conditions & precautions for the work to be done safely.					
Name	Autho. No.	Signature	Duration From	Duration To	Name	Autho. No.	Signature	Duration From	Duration To	Tel No.

Permit Close-Out

Permit Receiver:

Work is Completed ☐ YES ☐ NO

If work is not completed, state reason _____

Housekeeping Completed ☐ YES ☐ NO, Reason _____

Name:_____ Authorization No._____ Signature: _____ Date: _____ Time: _____

Acceptance by Permit Issuer:

Confirm Work completed ☐ YES ☐ NO Confirm housekeeping completed ☐ YES. ☐ NO Notify effected Area ☐ YES ☐ N/A

Name:_____ Authorization No._____ Signature: _____ Date: _____ Time: _____

Appendix SHEM-08.10A (Page 1of2)

Serial No. _____

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LMRA (Permit Receiver)

LAST MINUTE RISK ASSESSMENT: Take a minute of think through a job before the job is started

* Is the access / egress and lighting adequate?	YES ☑	NO ☐	
* Is the task safe to do in today's weather condition?	YES ☑	NO ☐	
* Do all team members have a full understanding of the task, hazards & mitigation?	YES ☑	NO ☐	
* Are the Manual call point, assembly area point & safety shower known?	YES ☑	NO ☐	
* Verify lockout /tag out are applied before job started.	YES ☑	NO ☐	N/A ☐
* Ensure Tools and equipment to be used are inspected & healthy.	YES ☑	NO ☐	
* Verify all control measures in formal JSA and / or hazard Assessment and control forms are implemented before starting the job.	YES ☑	NO ☐	

If you answer NO to any of the above questions, the Task shall not be performed without mitigate of the new Risk as well as the implementation of formal JSA and/or hazard Assessment Forms.

Gas Tester

Test: ☐ YES ☐ N/A If Yes - Frequency _____ hr. Or ☐ Continuous

Time	Oxygen 20.8%	LEL 0%	CO 25 PPM	CO2 5000 PPM	H2S 1.0 PPM	- PPM	- PPM	Name	Auth. No.	Signature

Receiver (Crew members)

To be signed by crewmembers at the field just before starting the job.

ID No.	7271	7371	7472									
Signature	M	X	Z									

Serial No. _____

HIGH PRESSURE JETTING WORK PERMIT

PART A: LOCATION OF ACTIVITY (RECEIVER)

Department / Unit: Date: _____ No. of worker: _____

Work Location:

Equipment / Item:

Type Of the Activity: ☐ HIGH PRESSURE WATER ☐ SAND BLASTING

PART B: WORK TO BE DONE (RECEIVER)

Work to be done (Including Method/Equipment/Substances/Limitations)

PART C: PERSONAL PROTECTIVE EQUIPMENT (RECEIVER)

☐ Goggles	☐ Anti -Slippery gloves	☐ Chemical/ Water resistant boots
☐ Ear Protection	☐ Face Shield	☐ Respiratory Protection
☐ Fully Body Harness	☐ Chemical Suit	☐ Dust Mask
☐ PVC Suit	☐ Hydrocarbon Cartridge	☐ Specify Type: _____

PART D : (WORK SITE PREPARATION (ISSUER & RECEIVER)

		YES	N/A
1	LOTO Performed; Certificate.#. _____	☐	
2	Manholes, Catch Pits / Basins, Sewer Covered?	☐	☐
3	Chemicals SDS Data Required at Work Location	☐	☐
4	Ensure Tools and Equipment are Inspected	☐	
5	Ensure Water Gun Auto stop interlock available	☐	
6	Anti-Withdrawal Device installed on pipe entrance	☐	☐
7	Whip Check arrestor available and installed between pipe connection	☐	
8	Back side discharge protection	☐	
9	Ensure no hot work activity surround hydro jetting area	☐	☐
10	Use of Certified nozzle operator	☐	Certificate Number: _____
11	Ensure Hazard Assessment and Control Form has been reviewed by issuer & receiver	☐	
12	Work Area Barricaded Warning Sign posted (6 meter in all direction) as per allowable exposure limit	☐	
13	Emergency Stop bottom tested & in proper conduction	☐	
14	Hazard Assessment and control completed ☐ Yes: Doc.#. _____ (if Formal JSA required, JSA Form #.: _____)	☐	
15	Verify the need of Fire watch if required. Name: _____ Authorization.#.: _____	☐	☐
16	Does The Activity Required Special Tool to be used ☐ Yes ☐ No (Specify _____ : _____ : _____ : _____)		

Gas Tester

Test: ☐ YES ☐ N/A If Yes - Frequency _____ hr. Or ☐ Continuous (Gas Meter Device. #. _____)

Time	Oxygen	LEL	CO	CO2	H2S	-	-	Name	Auth. No.	Signature
	20.8%	0%	25 PPM	5000 PPM	1.0 PPM	PPM	PPM			

Authorization (After joint site visit)

Affected Area Counter Sign by supervisor or above : ☐ YES ☐ N/A (ISSUER)

Plant: _____ Name: _____ Signature: _____ | Plant: _____ Name: _____ Signature: _____

Authorization (After joint site visit)

Time Issued From: _____ To: _____

Permit Issuer	Permit Receiver
I have checked & certify that the conditions & precautions required are as stated & work can be carried out safely.	I hereby accept the stated conditions & precautions for the work to be done safely and perform before starting the job.
Name: _____ ID No. _____	Name: _____ ID No. _____
Authorization No.: _____ Signature : _____	Authorization No.: _____ Tel. No. _____
Area Operator Informed (Name): _____ (ID.#.): _____ signature: _____	Signature : _____

Extension/ Endorsement

☐ Extension ☐ Endorsement

Permit Issuer: I have checked & certify that the conditions & precautions required are as stated & work can be carried out safely.					Permit Receiver: I hereby accept the stated conditions & precautions for the work to be done safely.					
Name	Authorization No.	Signature	Duration From	To	Name	Authorization No.	Signature	Duration From	To	Tel No.

Permit close-out

Permit Receiver:

Work is Completed ☐ YES ☐ NO

If work is not completed, state reason _____

Housekeeping Completed ☐ YES ☐ NO, Reason _____

Name: _____ Authorization No. _____ Signature: _____ Date: _____ Time: _____

Acceptance by Permit Issuer:

- Confirm Work completed ☐ YES ☐ NO - Confirm housekeeping completed ☐ YES ☐ NO - Notify effected area ☐ YES ☐ N/A

Name: _____ Authorization No. _____ Signature: _____ Date: _____ Time: _____

Appendix SHEM-08.10H (page1of2)

Serial No. _____

HOT WORK PERMIT

PART A: LOCATION OF ACTIVITY (RECEIVER)

Department / Unit: Date: _____ No. of worker: _____

Work Location:

Equipment / item:

PART B: WORK TO BE DONE (RECEIVER)

Work to be done (Including Method/Equipment/Substances/Limitations)

PART C: WORK SITE PREPARATION AND PERSONAL PROTECTIVE EQUIPMENT (ISSUER & RECEIVER)

	DESCRIPTIONS:	YES	N/A
1	Ensure LOTO is performed? Certificate #. _____	☐	☐
2	Work area clean & free from combustible materials	☐	☐
3	Manholes, catch pits/basins, sewer connections are covered?	☐	☐
4	Process vents & manhole vents direct away from work site?	☐	☐
5	Toxic Flammable materials within 15m radius of work area removed	☐	☐
6	Work area barricaded Warning sign and fence & Fire blanket is provided	☐	☐
7	SDS data required in work location, if exposed to hazardous chemicals	☐	☐
8	Will this work affect operations or other maintenance jobs within 15m radius?	☐	☐
9	Ensure grating guardrail in place and secured properly	☐	☐
10	For Welding activity, Ensure welding checklist is attached	☐	☐
11	Ensure Gas Test taken before Vehicle Entry At Plant Area.	☐	☐
12	Use of Non-Spark tools if required	☐	☐
13	Fire Extinguisher is available hot work location	☐	☐
14	Does The Activity Required Special Tool to be used ☐ Yes ☐ No (Specify _____ : _____ : _____ : _____)		
15	Hazard Assessment and control completed ☐ Yes: Doc.#. _____ (If Formal JSA required, JSA Form # : _____)		

PART D: PERSONAL PROTECTIVE EQUIPMENT

☐ Ear Protection	☐ Goggles
☐ Welding Shield	☐ Face Shield
☐ Full Body Harness	☐ Dust Mask
☐ SCBA	☐ Mask Respirator
☐ Leather Gloves	☐ Hot Sticks
☐ Chemical Glove	☐ Non-Spark Tools
☐ Welding Gloves	☐ Other: _____
☐ Coated Gloves	_____
☐ Thermal Gloves	_____
	_____

Fire Watch

Name	Authorization No.	Signature	Time/duration as Stand By after job completed

Gas Tester

Gas Test: ☐ YES If Yes - Frequency _____ hr. Or ☐ Continuous (Gas Meter Device. #. _____)

Time	Oxygen 20.8%	LEL 0%	CO 25 PPM	CO2 5000 PPM	H2S 1.0 PPM	– PPM	– PPM

Name	Auth. No.	Signature

Authorization (After joint site visit)

Affected Area Counter Sign by supervisor or above : ☐ YES ☐ N/A (ISSUER)

Plant: _____ Name: _____ Signature: _____ Plant: _____ Name: _____ Signature: _____

Time Issued From: _____ To: _____

Permit Issuer	Permit Receiver
I have checked & certify that the conditions & precautions required are as stated & work can be carried out safely.	I hereby accept the stated conditions & precautions for the work to be done safely and perform before starting the job.
Name: _____ ID No. _____	Name: _____ ID No. _____
Authorization No.: _____ Signature : _____	Authorization No.: _____ Tel. No. _____
Area Operator Informed (Name): _____ (ID.#.): _____ signature: _____	Signature : _____

Extension / Endorsement

☐ Extension ☐ Endorsement

Permit Issuer: I have checked & certify that the conditions & precautions required are as stated & work can be carried out safely.					Permit Receiver: I hereby accept the stated conditions & precautions for the work to be done safely.					
Name	Autho. No.	Signature	Duration From	To	Name	Autho. No.	Signature	Duration From	To	Tel No.

Permit close-out

Permit Receiver:

Work is Completed ☐ YES ☐ NO

If work is not completed, state reason _____

Housekeeping Completed ☐ YES ☐ NO, Reason _____

Name: _____ Authorization No. _____ Signature: _____ Date: _____ Time: _____

Acceptance by Permit Issuer:

- Confirm Work completed ☐ YES ☐ NO - Confirm housekeeping completed ☐ YES ☐ NO - Notify effected Area ☐ YES ☐ N/A

Name: _____ Authorization No. _____ Signature: _____ Date: _____ Time: _____

Appendix SHEM-08.10B (Page 1of2)

LOTO No. _____

LOTO & EQUIPMENT ISOLATION CERTIFICATE

SECTION 1 (Filled by the Owner)

Isolate energy source for the following equipment:

Department _____ Equipment. Tag #. _____ Location: _____ Time: _____

Purpose / Work Description:

Supervisor Name	Authorization No.	Date	Time	Signature

Note: This certification is only an Authorized for Equipment Isolation, but to perform the job, work permit is required.

SECTION 2 (Filled By Authorized LOTO)

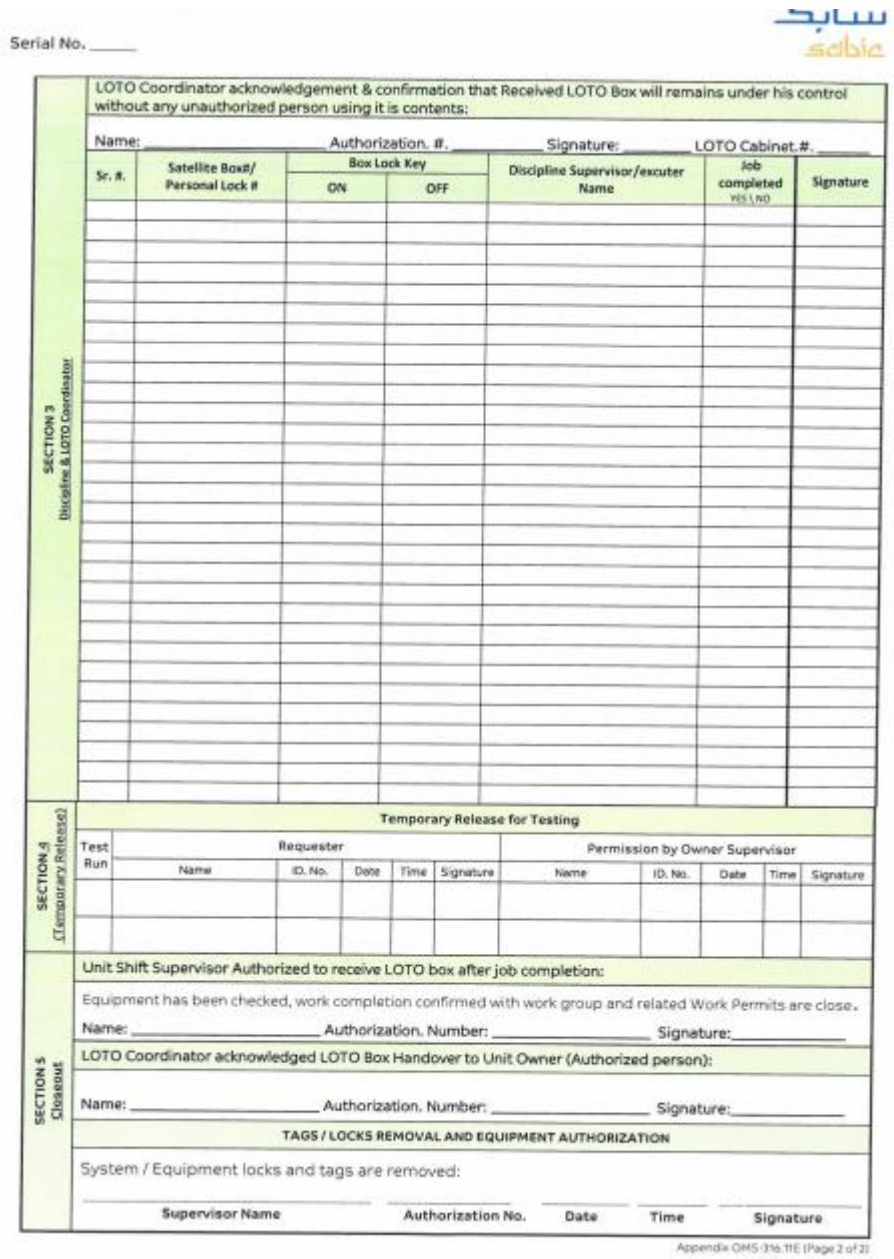
USED CODES TO IDENTIFY TYPES OF METHOD ISOLATION

LOCK Box Number: _____ General Lock#: _____ LOTO Auth.Person Number: _____ Sig. _____

LK – LOCK	DL – DISCONNECTED LINE	GD – GROUND
OV – OPEN VALVE	CB – CIRCUIT BREAKER	BF – BLIND FLANGE
CV – CLOSED VALVE	ED – ELECTRIC DISCONNECT	SB – SLIP BLIND
OF – OPEN FLANGE	SS – START / STOP SWITCH	BD – BLOCKING DEVICE
SH – SPACE HEATER	RSL – RADIO ACTIVE SOURCE LOCKED	OG – OPEN GRATING / RAIL

Code	Lock/ Tag No	Location	Lock / Tag Status.						
			ON	Temp. Release		Temp. Release		OFF	Emp. Name
			ID.#.	OFF	ON	OFF	ON	ID.#.	

Serial No. _____



SECTION 3 (Discipline & LOTO Coordinator)

LOTO Coordinator acknowledgement & confirmation that Received LOTO Box will remains under his control without any unauthorized person using it is contents:

Name: _____ Authorization. #. _____ Signature: _____ LOTO Cabinet.#. _____

Sr. #.	Satellite Box#/ Personal Lock #	Box Lock Key		Discipline Supervisor/excuter Name	Job completed YES \ NO	Signature
		ON	OFF			

Serial No. _____

EC No.

EXCAVATION CLEARANCE

SECTION 1 (Area Owner)

Date Request: ___/___/___

Dept./Plant: _____ Facility/Unit: _____ Area: _____ Depth: _____

Purpose / Work Description: _____

Note: This certification is only an Authorized for Excavation, but to perform the job, work permit is required.

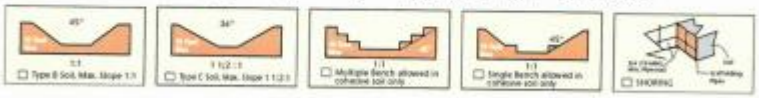
SECTION 2

CIVIL ENGINEER

* Is the relevant drawing provided & attached? ☐ YES ☐ N/A
* If 3 meters or more, attach approved shoring plan with calculations ☐ YES ☐ N/A
* Established Load carrying capacity of soil plan using mobile industrial equipment for in & near Excavation ☐ YES ☐ N/A
* Has the area been checked? ☐ YES

Protective System selected is / are...

SLOPING	TRENCHING	SHORING	NOT REQUIRED	SPECIAL DESIGN
☐	☐	☐	☐ (Excavation is less than 1.2m	☐ Drawing provided



Name: _____ Badge No. _____ Signature: _____ Date: _____

SECTION 3

ELECTRICAL ENGINEER

* Has the area been checked? ☐ YES Drawing / P&ID's Number: _____
* Are there any underground cable? (If YES, mark attached drawing)

Electrical		Telephone		Instrument		Cathodic Protection	
Yes	No	Yes	No	Yes	No	Yes	No
☐	☐	☐	☐	☐	☐	☐	☐

* Electrical marked underground cable? ☐ YES ☐ N/A
* Recommendation means of excavation: ☐ Manual Specify Manual Excavation Depths: _____ ☐ Machine Specify Machine Excavation Depths: _____

Comments/Precaution: _____

Electrical Engr. Name: _____ Badge No. _____ Signature: _____ Date: _____

SECTION 4

MECHNICAL ENGINEER

* Are there any underground pipeline? ☐ YES ☐ NO (If YES, mark drawings) Drawings Number: _____
* Are there any underground structure beams/obstacles ☐ YES ☐ NO (If YES, mark drawings) Drawings Number: _____
* Has the area been checked? ☐ YES
* Recommendation means of excavation ☐ Manual Specify Manual Excavation Depths: _____ ☐ Machine Specify Machine Excavation Depths: _____

Mechanical marked underground pipelines? ☐ YES ☐ N/A

Comments/Precaution: _____

Mechanical Engr. Name: _____ Badge No. _____ Signature: _____ Date: _____

SECTION 5 (Approval)

EXCAVATION PREPARATION CHECKLIST

1. Underground cables properly de-energized, locked and tagged-out ☐ YES ☐ NO (If NO, Select hand tool) ☐ N/A
2. Underground pipeline isolated, de-pressurized, drained and tagged-out ☐ YES ☐ NO (If NO, Select hand tool) ☐ N/A
3. Recommendation means of excavation ☐ Manual ☐ Machine
4. Confined Space Entry Permit is required (excavation greater than 1.2 meters) ☐ YES ☐ N/A

Authorized Shift Supervisor	Badge No.	Signature	Date	Time

Executor Dept. Sr. Manager	Signature	Date	Time

I have checked and certify the conditions and precautions required are as stated and I have discussed with area supervisor & area manager accordingly.

Area Owner Dept. Sr. Manager	Signature	Date	Time

Appendix SHEM 08.100

Classification: Internal Use

Control Number	Company Name Management System	سابك sabic
Rev: XX		
Date: XXXXX	Lock-Out/Tag-Out Specific Procedure	
Page 1 of 1		

Plant:	Unit/Area:
Job Purpose :	
Equipment Number:	
Attached the Marked-up P&ID or Single Line if applicable.	

A. Isolation and Try out Step

Step #	Activity/ Checks	Energy Type/ Magnitude	Isolation/ Try out	Isolation Executer	Type of LOTO Used	* Remarks
1	V2	Chemical			Tag & Lk	
2	V5				"	
3	V4				"	
4	RS1				"	Radiation
5	V3				"	
6	V8				Tag & LK	
7	MA				"	Electrical

B. De-Isolation Step

Step #	Activity/Checks	Energy Type / Magnitude	De-Isolation Executer	Remarks
1	↑			
2				
3				
4				
5				
6				
7				

Remarks: - "Special PPE Requirment"
- "Other"

	Prepared By	Reviewed By	Approved by (Sr. Manager/Manager)
Name			
Signature			

Serial No. _____

LIFTING PLAN

SECTION 1 (Rigger)

Serial Number: _____ Contractor Name: _____

Plant / Unit: _____ Equipment Tag No.: _____ Date: _____

Job Description : _____

CRITICAL LIFT ☐	NON- CRITICAL LIFT ☐

For More information about critical and non-critical lifting please refer to the Lifting Classification Matrix "LCM"

SECTION 2 (Rigger)

ACTIVITY DETAILS: (Details of the Load)

Description of Load:

Weight Load:	Kgs.	☐ Known Weight	☐ Estimated Weight
Dimension of Load :			
Lifting Height:		Wind Speed (Max 32 Km/Hr.):	
Center Of Gravity	☐ Obvious	☐ Estimated	☐ Determine by Drawing

Lifting Method	Type	Length/Capacity	Total
	Mobile Crane/Boom Truck ☐		
	Over Head Crane ☐		

CRANE INFORMATION:

Type of Crane:		Crane Model:		Crane Capacity:	

3rd Party Inspection Validity Date:

LIFTING PLAN (Over Head Crane)

Weight of Load + Contingency =	
Total Rigging Weight = (Shackles/Slings, other)	Kgs.
Total Load = Weight of Load + Total Rigging Weight: Kgs.	Percent of Crane Capacity =
Safety Factor (%) =	Additional information, if any:

LIFTING PLAN (Mobile Crane):

Work Radius (Meters):			Total Boom Length:			
Boom Length to be used (Meters):			Boom Angle:			
Weight of Load + Contingency =			Lifting Quadrant Zone	360°	180°	90°

Total Rigging Weight =				
	Main Block :	Kgs.	Shackles/Slings:	Kgs.
	Auxiliary Block:	Kgs.	Spreader Bar:	Kgs.
	Auxiliary Boom Head :	Kgs.	Others:	Kgs.
	Load Line :	Kgs.	Others:	Kgs.
	JIB :	Kgs.	Others:	Kgs.
	Ball :	Kgs.	Others:	Kgs.
	Whip Line :	Kgs.	Others:	Kgs.

Total Load = Weight of Load + Rigging Weight :	Kgs.	Percent of Crane Capacity =	
Crane Capacity at Work Radius =	Kgs.	Safety Factor (%) =	
Number & Capacity of Part Lines =		Heavy Duty Crane mats require:	YES ☐ NO ☐
Additional information, if any:		Counter Weight to be used:	

SECTION 3 (Rigger)

Means Of Communications:

- Can the operator see the loading and unloading point for the load from his position? ☐ Yes ☐ No
- What are the means of communication between the lifting crew? ☐ Standard hand signals ☐ Radio ☐ Others _____

Filling by Civil Expert:

Ground Bearing Capacity		Calculated By:			
		Name:			
Ground Condition	Route From Site Entrance to Lifting Location	Concrete ☐	Tarmac ☐	Sand ☐	
	Lifting Location	Concrete ☐	Tarmac ☐	Sand ☐	

Out rigger &Tracks/Lift Area Hazards				
	Soft Ground ☐	Manhole Covers ☐	Underground Services ☐	Trenches/Excavations ☐

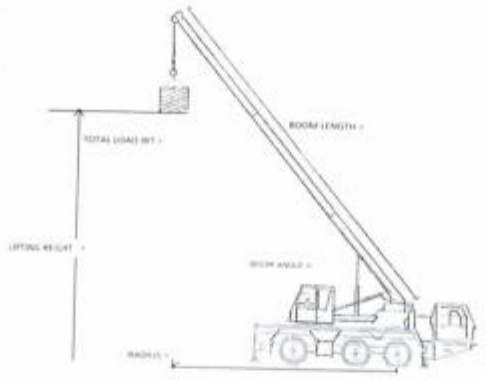
Classification: Internal Use

Serial No. _____

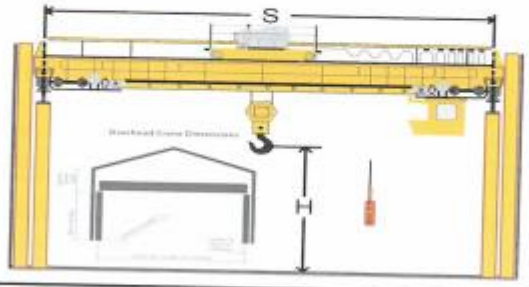
SECTION 4	PREPARATION				
	Position	Name	ID	Authorization No.	Signature
	Rigger				
	Crane Operator				
SECTION 5	APPROVAL FOR NON-CRITICAL				
	Position	Name	ID		Signature
	Affiliate Lifting/ Rigging Supervisor				
	Operation Supervisor				
SECTION 6	THE FOLLOWING APPROVALS REQUIRED FOR CRITICAL LIFTS				
	Position	Name	ID		Signature
	Affiliate Lifting/ Rigging Expert				
	Maintenance Manager (In case of TANDAM Lift: Snr. Manager)				
	Operation Manager (In case of TANDAM Lift: Snr. Manager)				

LIFT DRAWING The drawing must include all measurements: (Location, Route and End Location of Load, Crane Position, Boom Tip Height and Radius, Load Dimensions and maximum Height of Lift, Anchorage Point.

MOBILE CRANE:



OVERHEAD CRANE:



Lifting plan completion Date:_____

Permit Issuer(Name): _____(Signature):_____ Rigger Supervisor (Name): _____(Signature):_____

Serial No. _____

RADIATION WORK PERMIT

PART A: LOCATION OF ACTIVITY (RECEIVER)

Department / Unit: Date: _____ No. of worker: _____

Work Location:

Equipment / Item:

PART B: WORK TO BE DONE (RECEIVER)

Work to be done (including Method/Equipment/Substances/Limitations)

PART C: PERSONAL PROTECTIVE EQUIPMENT (RECEIVER)

☐ Face Shield	☐ Rubber Gloves	☐ TLD to radiographers
☐ Footwear (Type) _____	☐ Ear Protection	☐ Respirator (Type): _____
☐ Full Body Harness	☐ Other:_____	☐ Other:_____

PART D : WORK SITE PREPARATION (ISSUER & RECEIVER)

Preparation Check List, mention any abnormality or additional precaution in the space provided or on a hazard assessment/control sheet

		YES	N/A
1	Source exposed time From: _____ To: _____		
2	Radiation Source is isolated & tagged, LOTO Certificate No. _____	☐	☐
3	Radiation area barricaded and evacuated?	☐	
4	Caution signs posted?	☐	
5	Warning Lights, etc. positioned?	☐	☐
6	Radiation Area monitored?	☐	
7	Notification of radiation work (paging)?	☐	
8	Prior to start & after completion of Radiography, ensure the radiography machine vehicle parked away from office premises to avoid exposure to unknown employees.	☐	☐
9	Ensure availability of valid TLD for each person	☐	
10	Area survey conducted, no abnormality	☐	
11	Authorized RSO: - Radiation Source strength .....(Curie) / Required Safe Distance .....(Meter)		
12	Hazard Assessment and control completed ☐ Yes: Doc.#. _____ (If Formal JSA required, JSA Form #.:_____)		
13	Does The Activity Required Special Tool to be used ☐ Yes ☐ No (Specify_____:_____:_____:_____)		
14	Activity Require Fire Watch ☐ Yes ☐ N/A if Yes: Name:_____ Authorization No._____		

Gas Tester

Test: ☐ YES ☐ N/A if Yes - Frequency _____ hr. Or ☐ Continuous (Gas Meter Device. #. _____)

Time	Oxygen	LEL	CO	CO2	H2S	-	-	Name	Auth. No.	Signature
	20.8%	0%	25 PPM	5000 PPM	1.0 PPM	PPM	PPM			

Authorization (After joint site visit)

Affected Area Counter Sign by supervisor or above : ☐ YES ☐ N/A (ISSUER)

Plant:_____ Name:_____ Signature:_____

Plant:_____ Name:_____ Signature:_____

Authorization (After joint site visit)

Time Issued From: _____ To: _____

Permit Issuer	Permit Receiver
I have checked & certify that the conditions & precautions required are as stated & work can be carried out safely.	I hereby accept the stated conditions & precautions for the work to be done safely before starting the job.
Name: _____ ID No. _____	Name: _____ ID No. _____ Permit Auth. No._____
Authorization No.: _____ Signature : _____	RSO Authorization No. _____ Signature : _____
Area Operator Informed (Name):_____ (ID.#.):_____ signature:_____	

Extension Endorsement

☐ Extension ☐ Endorsement

Permit Issuer: I have checked & certify that the conditions & precautions required are as stated & work can be carried out safely.					Permit Receiver: I hereby accept the stated conditions & precautions for the work to be done safely.					
Name	Authorization No.	Signature	Duration From	To	Name	Authorization No.	Signature	Duration From	To	Tel No.

Permit close-out

Permit Receiver:

Work is Completed ☐ YES ☐ NO

If work is not completed, state reason _____

Housekeeping Completed ☐ YES ☐ NO, Reason _____

Name:_____ Authorization No._____ Signature: _____ Date: _____ Time: _____

RSO Authorization No. _____ Signature : _____

Acceptance by Permit Issuer:

- Confirm Work completed ☐ YES ☐ NO - Confirm housekeeping completed ☐ YES ☐ NO Notify effected Area ☐ YES ☐ N/A

Name:_____ Authorization No._____ Signature: _____ Date: _____ Time: _____

Serial No. _____

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LMRA Permit Receiver

LAST MINUTE RISK ASSESSMENT: Take a minute of think through a job before the job is started

* Is the Access / Egress and lighting adequate ?	☐ YES	☐ No	
* Is the task safe to do in today's weather condition ?	☐ YES	☐ No	
* Do all team members have a full understanding of the task, hazards & mitigation?	☐ YES	☐ No	
* Are the Manual call point, assembly area point & safety shower known?	☐ YES	☐ No	
* Verify lockout /tag out are applied before job started.	☐ YES	☐ No	☐ N/A
* Ensure Tools and equipment to be used are inspected & healthy. .	☐ YES	☐ No	
* verify all control measures in formal JSA and/or hazard Assessment and control form are implemented before starting the job.	☐ YES	☐ No	

If you answer NO to any of the above questions, the Task shall not be performed without mitigate of the new Risk as well as the implementation of formal JSA and/or hazard Assessment Forms.

Gas Tester

Test: ☐ YES ☐ N/A If Yes - Frequency _____ hr. Or ☐ Continuous

Time	Oxygen	LEL	CO	CO2	H2S	-	-	Name	Auth. No.	Signature
	20.8%	0%	25 PPM	5000 PPM	1.0 PPM	PPM	PPM			

RSO

Readings taken at the control boundaries:

Time		Readings(uSv/hour)

Receiver (crewmembers)

To be signed by crewmembers at the field just before starting the job.

ID.#											
Signature											

Notes

1) Tick (√) for applicable boxes and Tick [-] for not applicable boxes in the permit..
2) Perform LMRA before starting the job.
3) 2nd copy to be displayed at worksite until close-out and then exchange the copy with permit issuer.

Appendix SHEM-08.10F (Page2of2)

SR.#.

HAZARD ASSESSMENT AND CONTROL FORM

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Sec-1

Department/ Unit: PL Equipment/Location: TR # 1 Issued Date: 10-11-2020 Execution Date: 16-11-2020

Description of the work/Task (including Method/Equipment/Substances/Limitations): Replace valve on 5 bar system

Section-2

1. What can go wrong?

☑ Slips / Trips / Fall / Strain	☐ Noise	☐ Radiation
☐ Dust / Fumes / Mist	☐ Vibration	☐ Electrical Shock /Arc Flash/ Static electricity
☐ Fall from height	☑ Pressure	☐ Movement / Hit by / Caught in between
☐ Poor Visibility	☐ Heat / Hot Surface	☐ Damage to EHSS critical assets.
☐ Blind Spot / Shadows	☑ Chemical presence	☐ Falling Objects/ Flying Objects
☐ O2 Deficiency / Enrichment	☐ Cryogenic Material	☐ Heat Stress / Cold stress
☐ Flammable Material	☐ Cut / Pinching	☐ Other Specify:
☐ Wrong Posture	☑ Fire / Explosion	☐ Other Specify:

2. What can cause it to go wrong?

☑ Sharp Edges/Manual Handling	☐ Excavation	☐ Expose to Electrical
☐ Contact with electric current	☐ Nitrogen handling	☑ Tools / Equipment involved/Congested area
☐ Working at height	☐ Start/Stop Machinery	☐ Awkward Positions / Static Postures
☐ Poor Lighting	☑ Lifting activity.	☐ Contact with Hot Surface
☐ Mobile Equipment	☐ Radiation source	☑ Dealing with high pressure
☐ Contact with Machinery	☐ Vehicle Entry	☐ Hazardous substance / Source of Ignition
☐ Radiant heat source	☑ Release of energy	☐ Bypass of EHSS critical devices
☑ Environmental conditions	☐ Other Specify:	

Potential Hazard: ... ; ... ; ... ; ...

Section-3

3. What can be done to prevent it?

☑ Avoid Hand lifting	☐ Provide Machine guards.	
☑ Use of Tested & Certified Tools	☑ Maintain Housekeeping.	
☐ Physical Guard Rails	☑ Remove combustibles / flammable materials.	
☐ Provide sufficient lights.	☐ Provide continuous ventilation to worksite.	
☐ Provide certified lights / flashlights.	☐ Grounding / bonding to avoid static electricity.	
☑ Use of Competent User	☑ Sound proof barriers to avoid high level Noise.	
☑ Blinds Installation	☐ Use of Flagman	
☑ Check equipment in close proximity	☑ Area Barricade / Fencing	
☑ Lock out/Tag out (energy isolation)	☐ Other Specify:	
☐ Provide GFCI / ELCB.	☐ Other Specify:	
☐ Fire Blanket / curtains / Wet Area.	☐ Other Specify:	

4. If it does go wrong what can be done to minimize the negative consequences?

☑ Report to Clinic	☐ TLD-Thermoluminescent dosimeter to radiographers	
☑ Provide Fire Extinguisher / Fire hose.	☐ Determine safe distance from radioactive source	
☑ Location of Safety Shower / Eyewash	☐ Conduct Survey for monitoring (radiation area)	
☐ Stand by ERT	☐ Install of retrieval device	
☑ Tool Box Talk with Crewmembers	☑ Provide warning signage	
☑ Provide Work instructions	☐ Other Specify:	
☐ Use of Air horn		
☐ Fall Arrest/Harness		
☐ Rotation of workers	☐ Additional PPE To be Used:	
☐ Provide communication tools		
☑ Location of Manual call point - MCP		

Mitigation Plan: ... ; ... ; ... ; ...

Section-4

☑ Hand Tools	☐ Generator/Compressor	☐ Transmitters Calibration	☐ Vibration Monitor	☐ Gas Torch	☐ Voltage Detector	☐ Grit Blaster	☐ Crane
☐ Hydraulic Tools	☐ Grinder	☐ Hydro-jetting machine	☐ Electric Tools	☐ Others (Specify) : chainblock.			

Section-5

Receiver Supervisor (direct/contractor): (Name): _____ (Signature): _____ Owner Supervisor : (Name): _____ (Signature): _____

Q: Select **One type of work permit** required for doing this Task:

☐ Hot Work Permit. ☐ Electrical Work Permit. ☐ HP Jetting Work Permit. ☐ Radiation Work Permit. ☐ Excavation Work Permit. ☑ General Work Permit. ☐ Lifting Work Permit.

Notes

* Owner Supervisor and Maintenance Supervisor shall discuss Hazard Assessment and Control Form Face to face.

** Tick mark for the related hazard identification & Control Measures points, then write applicable points above in section-02 & section-03 (Potential Hazard & Mitigation Plan).

SR.#

HAZARD ASSESSMENT AND CONTROL FORM

*** Tick (√) for applicable boxes and Tick [-] for not applicable boxes in the permit.

Appendix SHEM-08.10V (Page1of2)

Section-06: Risk Evaluation Guidelines Table.

POTENTIAL CONSEQUENCES OF ERROR		TASK COMPLEXITY		HOW FREQUENT IS TASK DONE BY TEAM	
A		B		C	
3	(Very) Low	0	Simple	0	Often
4	Moderate	1	Moderate	1	Once in a while
5	(Very) High	2	Complex	2	Never

Combine the assigned potential Consequence (A) + assigned complexity (B) with the experience on the assigned task (C)

A+B+C= TOTAL RISK FACTOR

Note: *Major risk always shall be assessed through Formal JSA.*

TOTAL RISK FACTOR SCORE TRANSLATES TO THE WORK CONTROL PERMIT PROCESS AS INDICATED BELOW

9 – 10	☐	Major Risk	• Management Approval required • Formal Job Safety Analysis	Permit Issuer and Unit Manager
6 – 8	☐	Significant RISK	• Hazard assessment & control Form shall be attached with work permit • Detailed instructions / job method • Close supervision and/ or support	Permit Issuer shall obtain the approval from unit manager and need to decide on necessity for formal JSA.
4 – 5	☑	MINOR RISK	• Hazard assessment & control Form shall be attached with work permit • Detailed instructions / job method sheet	Permit Issuer
0 – 3	☐	LOW RISK	• Hazard assessment & control Form shall be attached with work permit	Permit Issuer

Q: If Risk is still Not **Properly Mitigated** after the initial hazard assessment Form (As per Section-06 risk evaluation guidelines); **Then Formal JSA is Required Further?**

Owner / Unit Manager Name:_____ **Signature:**_____ **(In case of Significant risk)**

Section-07: Re-validation Approval Process Before Issuing Permit

Q: If the activity required to continue for more than **One Week**: **(Re-validation)**

Approval by: (Owner/Unit Manager): _____ (Signature): _____ Approval by: (Maintenance Manager): _____ (Signature): _____

Note: Max. Validity of the form is 30 days (Form Validity-Date): _____

Permit issuer		Permit receiver		Revalidation additional precautions and comments (if required)	Permit issuer		Permit receiver		Revalidation additional precautions and comments (if required)
Date	Signature	Date	Signature		Date	Signature	Date	Signature	

Serial No. _____

CEP No: _____

CONFINED SPACE ENTRY

Section 1 Receiver

Department / Unit: _____ Date: _____

Equipment / Item: _____

Confined Space Entry Purpose : _____

Section 2 (Issuer & Receiver)

Confined Space Preparation Check List,	YES	NO	N/A
1. Has formal JSA conducted & copy is attached to permit? JSA#. ____	☐		
2. Check the availability of ☐ Escape Cylinder ☐ SCBA?	☐		☐
3. Process equipment/Line been properly decontaminated & depressurized	☐		☐
4. Approved Rescue Plan attached and Area Safe access provided (entry, exit)	☐		
5. Temperature accepted for entry to prevent heat stress SHEM-12.06?	☐		☐
6. Confined Space Entry affect other permits, jobs or process operations?	☐	☐	☐
7. Grating or guardrail will be removed, if yes, hard barricade and sign board "Danger" – Grating removed and barricading to be installed.	☐		☐
8. Is Pocket Oxygen monitoring meter available in each group?	☐		☐
9. Ventilation rate/air exchanges defined in line with work activity?	☐		☐
10. Safe Extra Low Voltage equipment used?	☐		☐
11. Is Communication System Available? (Radio, paging, communication tool)	☐		
12. Is Confined Space Entry Register Established?	☐		
13. Ensure Confined Space Area with good illumination /sufficient lighting?	☐		☐
14. Ensure Gas detector is calibrated & healthy to use.	☐		
15. Applicable LOTO Certificate Number	☐		☐

Section 3 Receiver

Special PPE Required

☐ Glove (Type) ____ ☐ Half/Full Mask ☐ Respirator Face ☐ Life Line

☐ Footwear (Type) ____ ☐ Face Shield ☐ Ear Protection ☐ Dust Mask

☐ Air Line Breathing ☐ SCBA ☐ Goggles

☐ Disposable Coveralls ☐ Chemical Suit ☐ Others : ____

Section 4 Receiver

Entry / Manhole Standby man required: ☐ YES

Details	Name	Auth. No.	Signature	Date
Standby man				
Standby man				
Standby man				
Standby man				

Section 5 Issuer

Affected Area Counter Sign by supervisor or above : ☐ YES ☐ N/A

Plant : ____ Name: ____ Signature: ____

Plant : ____ Name: ____ Signature: ____

Section 6 (Issuer)

Gas Tester: ☐ YES Frequency ____ hr. ☐ Continuous (Gas Meter Device. #, ____)

Time	Oxygen	LEL	CO	-	-	-	Name	Auth. No	Signature
	20.80%	0%	<25 PPM	PPM	PPM	PPM			

Oxygen levels shall be between 19.5 and 21% before entrance is allowed with a clear understanding of the reason for any observed deviation of the normal atmospheric value of ~20.8%.

Section 7 Authorization (After joint site visit)

Time Issued From: ____ To: ____

Permit issuer

I have checked & certify that the conditions & precautions required are as stated & work can be carried out safely.

Name : ____ ID No.: ____

Authorization No.: ____ Signature: ____

Permit Receiver

I have checked & certify that the conditions & precautions required are as stated & work can be carried out safely.

Name : ____ ID No.: ____

Authorization No.: ____ Signature: ____

Maximum number of persons allowed in Confined Space : ____

Section 8 (Issuer/ Receiver)

☐ Extension ☐ Endorsement (After joint site visit)

Permit Issuer					Permit Receiver				
Name	Auth. No.	Signature	Duration From	Duration To	Name	Auth. No.	Signature	Duration From	Duration To

Other Permit Issued in Confined Space (must be logged by Supervisor in Field)

Description of Activity	WP No.	Type of Work	Name	Signature	Time	Closed-Out Close Time	Closed-Out Signature

Section 9 (Issuer & Receiver)

Permit Close-out

Permit Receiver

Housekeeping Completed ☐ YES

Work is Completed ☐ YES ☐ NO

Name: ____

Signature: ____ Date: ____

Acceptance by Permit Issuer

Housekeeping Completed ☐ YES ☐ NO

Confirm Work Completed ☐ YES ☐ NO

Notify Affected Area ☐ YES ☐ N/A

Name: ____ Signature: ____

Date: ____

NOTE: 1.) Tick [√] for applicable boxes in the permit 2.) Tick [–] for not applicable boxes 3.) Perform LMRA before starting the job 4.) A Copy to be displayed at worksite until closeout and then exchange copy with the permit issuer.